

INSIDE: RAY BRADBURY & HARLAN ELLISON

FUTURE

LIFE

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AUGUST 1980

**HOW CONGRESS
SEES THE FUTURE**

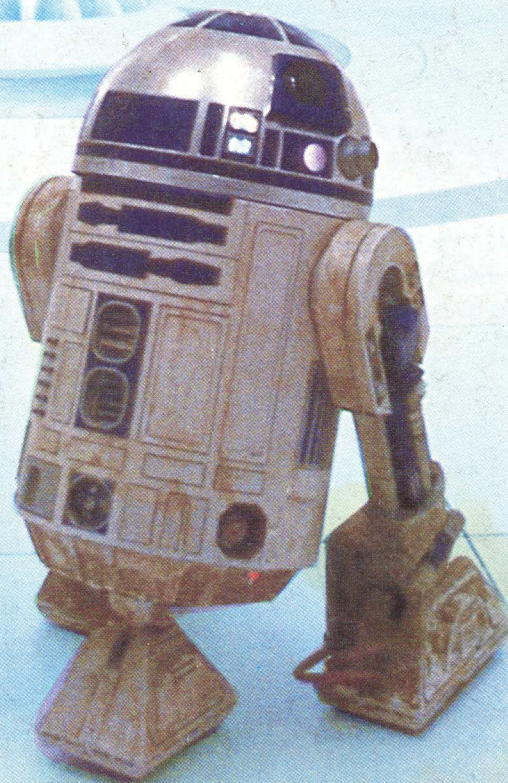
**WHAT'S
KEEPING THE
SPACE SHUTTLE
EARTHBOUND?**

**LEAPIN'
LASERS!**

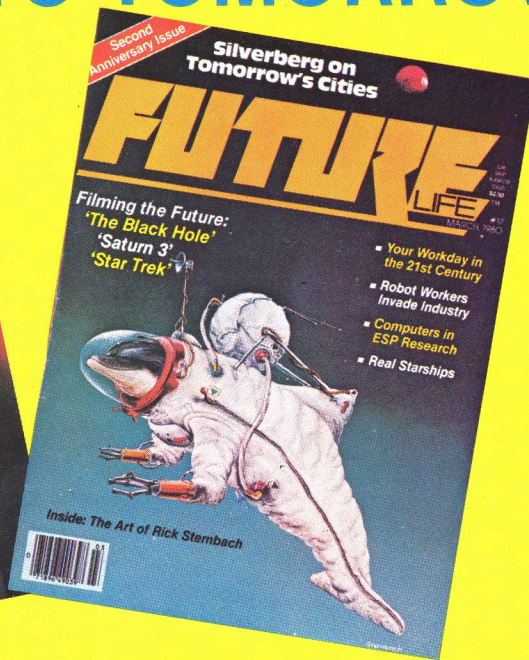
**JOHN LILLY:
UNDERWATER &
INNER SPACE**

**GARY NUMAN'S
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The Making of
an Empire
**Star Wars
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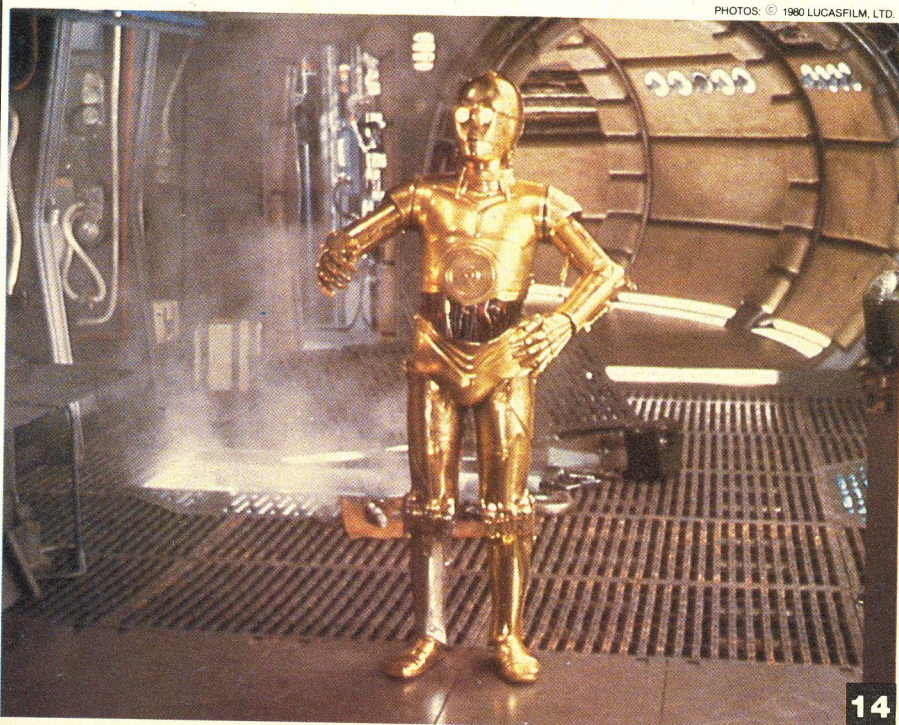
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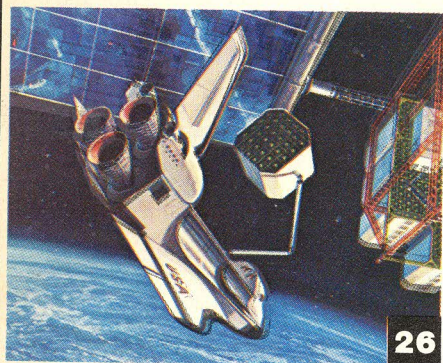
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PHOTOS: © 1980 LUCASFILM, LTD.



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ART: © 1980 KARL KOFOED



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New York, N.Y. 10016

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ON THE COVER: R2-D2 wanders through the gleaming halls of the Cloud City of Bespin in the second installment of the *Star Wars* saga, *The Empire Strikes Back*. For the full story on the film, see page 14.

Heeerrreee's HARLAN!

It's a matter of fact that Harlan Ellison really needs no introduction. In a STARLOG interview several years ago, Howard Zimmerman wrote, "... Ellison is a charismatic culture hero who is preceded by his reputation wherever he goes."

And it's a rather wild and wonderful reputation. Everyone knows that Ellison wrote the script for "City On The Edge Of Forever," one of the most unusual, dramatic and poignant of the *Star Trek* episodes. He has won six Hugo awards and two Nebulas for his science fiction writing. His novella, *A Boy And His Dog*, was made into a feature film. He is possibly the only major author who has written (and still is writing) comics. He edited collections of radical, inflammatory SF stories in a series of books called *Dangerous Visions*. And everyone knows that his TV scripts for *The Starlost* (and other series) have managed to remain breathtaking even after Ellison's original writing was chewed up and spit out in video format.

But mostly, everyone knows that Ellison—in his convention speeches, his TV and personal appearances, his columns and editorials—*speaks his mind!* He speaks a direct language with no sugar-coated words. He speaks harshly, abrasively and often offensively.

Now, what's a nice magazine like FUTURE LIFE doing with Harlan Ellison inside?

What's a nice dinner without pepper on the table? Every good meal needs a touch of spice—something *hot* to contrast the other flavors. The same is true of a good magazine.

I expect that Harlan will stir up uncomfortable thoughts and challenging values and that he will make us all angry on occasion. But that is *not* the main reason we have hired him to write a regular, uncensored, personal opinion column in this magazine.

The most important reason is that I have seen a rare and vital undercurrent in everything Harlan has ever written or said. No matter what his detractors may say, he does *not* seem to be motivated primarily by an outrageous, egocentric need to shout and be noticed. (Every artist that ever lived has the attitude, and properly so, that what he has to say is important and worth everyone's attention.) But I sense that Harlan's *main* motivation in life is *idealism*.

Yes, that's right. In spite of his sometimes crude pyrotechnics, the man is, in every case I know of, expressing disappointment with some *thing* or some *body* that does not live up to what he thinks *ought* to be—ideally. There is an impatience with anything less than right and perfect, and an urgency for everything to get better, not in the distant future, but *today*.

It is for that restless, critical undercurrent of idealism that we asked Harlan to join us in FUTURE LIFE. *He* may have different reasons for *accepting* our invitation, and in his introductory column (page 30) he has the opportunity to speak for himself—but these are *our* reasons.

Adding a celebrity columnist to our staff is an important move for our magazine. In spite of all the "futurist/science" magazines that blossomed on newsstands after FUTURE first appeared almost three years ago (some super slick, some pulp), I believe that we remain the most interesting, thought-provoking, lively, beautiful, fun-to-read, and inspiring of all.

FUTURE LIFE is a gourmet delight for everyone who looks forward to tomorrow. And now that the *pepper* is on the table, let's begin the feast.

—Kerry O'Quinn/Publisher

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Quality production of video cassettes is a slow and careful process. Right now we have ample stock to ship your order immediately, but when supplies are depleted, there will probably be a delay for additional production. If you want to enjoy these delightful science-fiction video programs right away—we suggest you send your order TODAY!

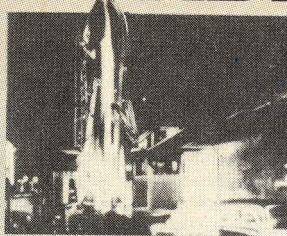
"SPACE PATROL" Vol. 1 (3 episodes)

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"TOM CORBETT—SPACE CADET" Vol. 1 (3 episodes)

B/W—Starring Frankie Thomas as Tom, this series became gigantically popular in early 50s, playing on four major TV networks, with a radio version, a comic strip and numerous merchandising tie-ins. Based on Robert Heinlein's book *Space Cadet*, the series had rocket expert Willy Ley as tech advisor. Includes: "Ace of the Space Lanes" & "The Martian Revolt," plus premiere 15-minute episode, "At Space Academy." (Commercials & Trailers)

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"ROCKETSHIP X-M"

Color tinted—Starring: Lloyd Bridges, Osa Massen, Hugh O'Brian, Noah Beery Jr., Morris Ankrum. First screen story dealing seriously with man's flight to another planet. A landmark adventure, directed by Kurt Neumann; music score by Ferde Grofe. (Original 1950 version.)



"KRONOS"

B/W—Starring: Jeff Morrow, Barbara Lawrence, John Emery, Morris Ankrum. A flying saucer crashes into the ocean, and a giant robot, capable of draining all Earth's energy, emerges. Atomic bombs are useless as it approaches L.A.



"INVADEERS FROM MARS"

Color—Starring: Arthur Franz, Helena Carter, Jimmy Hunt, Morris Ankrum. Young boy is unable to convince townspeople he has seen flying saucer land in backyard. One by one, his parents and others are "taken over" by invading aliens. Classic cult movie directed by William Cameron Menzies.



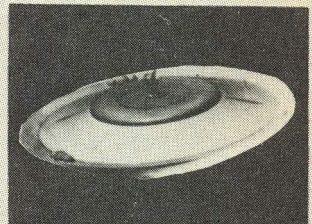
"TALES OF TOMORROW" Vol. 1 (3 episodes)

B/W—This classic SF anthology series was produced live from 1951 to '53 by George Foley with top-name writers and actors. Includes: "Frankenstein," starring Lon Chaney Jr.—"Read to Me Herr Doktor," a robot tale starring Mercedes McCambridge—"Tomb of King Tarus," a 4,000-year-old mummy, starring Walter Abel. (Includes commercials & trailers.)



"FLIGHT TO MARS"

Color—Starring: Cameron Mitchell, Marguerite Chapman, Arthur Franz. An expedition crashlands on the red planet and discovers an advanced underground civilization. Beautiful special effects, matte work! Produced by Walter Mirisch.



"THE FLYING SAUCER"

B/W—Starring: Mikel Conrad, Pat Garrison, Hanz Von Teuffen, Virginia Hewett. A huge saucer, hidden under a glacier, is the subject of search by U.S. and Russian scientists. This was the first film dealing with flying saucers and was reviewed by FBI before they allowed its release.



"THE CRAWLING EYE"

B/W—Starring: Forrest Tucker, Janet Monroe, Jennifer Jayne. A chilling SF terror tale of a shimmering alpine fog that contains deadly creatures from another planet. Victims are found decapitated; tremendous tension! Released in England as "The Trollenberg Terror," with music by Stanley Black.



"HIDEOUS SUN DEMON"

B/W—Starring: Robert Clarke and Nan Petersen. A scientist at an atomic lab is accidentally exposed to radiation which turns him into a grotesque killer reptile when sunlight hits him. A real gem of "camp" horror!



"STRANGER FROM VENUS"

B/W—Starring: Patricia Neal, Helmet Dantine, Derek Bond. A benevolent (but frightening) being from space lands to warn Earth and pave the way for arrival of "mother ship." Never released theatrically in U.S., this is essentially "The Day the Earth Stood Still" redressed. Historical! Fascinating!

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LORD OF LIGHT LIVES AGAIN?

... Regarding your article "Fallen Fantasy" in FUTURE LIFE #18:

The fantasy has not fallen at all. I have brought forth evidence which was corroborated by the district DA's office and I was completely exonerated from all charges and the pending case against me was completely dismissed. Mr. Jerry Schafer, who was then acting as my supervising producer, without my authorization xeroxed a copy of my signature and used that reproduction to obtain \$50,000 from a Colorado investor. The solicitation of the investor was done without my knowledge or authorization and was contrary to the rules and procedures established by my company and legal counsel. Criminal charges are pending against Mr. Schafer in Colorado and, although I will not comment on his case, I have disassociated from him and he is no longer in any way representative of anything related to Science Fiction Land or the film *Lord of Light*.

Some of the top creative people in the film industry have shared my vision of the enormous potentials of the film *Lord of Light*, as well as the Theme Park, Science Fiction Land. They are all very much behind me, and I am happy to report that production plans for the film, which was always my creative force, are going full speed ahead.

Barry Ira Geller
Barry Ira Geller Productions
North Hollywood, CA

THE WILD BLUE YONDER

... Having just read FUTURE LIFE #18 I must congratulate you for presenting an exciting vision of a futuristic "Sea City." Such floating sea cities may very well be necessary to help contain the world's growing population and even enable us to experiment with new energy alternatives such as clean burning hydrogen. However, if humanity really wants to save itself I will have to agree with Dr. Asimov that we must step out into outer space—not just the oceans.

Paul Justus
Mission, KS

SEA CITY SINKS

... The article on "Sea City" in FUTURE LIFE #18 I found to be interesting; but, just as your previous articles on outer space cities, I think that this is so far in the future as to be visionary only.

Fred L. Tate EWC
San Francisco, CA

EAGLE EYED

... In issue #17 of FUTURE LIFE magazine, I read in the Input column a little caption that read, "Notice anything different about this issue's cover?" Well, I sure did find out. Usually, FUTURE LIFE's cover has a framed picture showing what's inside the magazine, but this issue has a

full page painting and is not blocked off by a border around the picture. Also, there is a line under the title. Now, how much is the reward?

Alex Padovan
Sioux Lookout, Ont., Canada

Sorry, Alex. We were referring to the fact that the dolphin pictured on the cover is ambidextrous. The dolphins in all previous magazines were left-finned.

GOT YOU COVERED

... A few words about the cover of FUTURE LIFE #17 (Rick Sternbach's spacefaring dolphin): It was beautifully interesting. Most magazines strive to present the most imaginative covers available, which is fine, just and commendable. But only a few ever succeed to such a high degree as your recent issues, of which #17 is the latest. Or to put it simply, those famous three words which come from the lips of my friends when they spot the magazine on my desk, "What the ..." (fill in).

Tony Bird
Reedley, CA

COLD WAR WHOOPS

... Often you have insisted that to enter space, build space settlements, mine the Moon and asteroids and otherwise get off this cruddy meatball called Earth, we must work hand in hand with the U.S.S.R. and other non-Western countries. Impractical. Pure idealistic foolishness. Just look at the papers and you'll see why Russia can't be trusted. We could never co-exist. We want freedom and adventure. They care only about furthering "the state."

The only thing to do now is reinstitute the Space Race. Get there before They do. If They get so much as a foothold on the Moon, They'll make it hell for us. That Their brand of government could expand past Earth is frightening. Maybe this sounds like Cold War fever, and perhaps it is, but that's the way I see it. I only wish we'd never given the United Nations any authority over our affairs in space.

Timothy Blaes
Hendersonville, NC

SON OF 3-D

... It was with considerable interest that I read your article, "Quo Vadis 3-D?" I felt that the copy was very good, as far as it went.

Since the very title implies a forecast as to where 3-D is going, I felt that some additional information is advisable, so that readers would not be left with the impression that the systems mentioned are the only ones in existence or on the horizon.

Considerable space in the article was devoted to the Spacevision system, developed by the late Robert Bernier. At the time of its first public introduction, it was the state-of-the-art as far as systems available to professional stereocinema producers. This was some 14 years ago.

Although, as pointed out in the article, Spacevision is still available, today advanced systems are available which no longer suffer from the limitations of the previous decade.

Modern equipment is extremely versatile, permitting nearly all of the artistic and technical procedures attributed to flat cinematography to be applied to stereoscopic works as well. For example, the companies StereoVision, Dimension-3, and my own StereoScope each have available systems which may be used on a number of professional cameras, including modern reflex equipment, in a

variety of film sizes, with a variety of lenses. StereoVision has a variety of systems tailored to numerous formats and applications, both industrial and theatrical. Dimension-3 features computer controlled systems, and StereoScope offers a system which may be used with a wide variety of prime lenses, including telephoto and macro close-up, as well as the widest range of stereo base (interaxial) and convergence control available.

Each of these systems is available now, and no doubt will play an important role in development of the stereocinema of the near future. As different systems offer a variety of approaches with differing cost factors, producers anticipating stereoscopic film presentations would be well advised to contact each of the companies offering equipment, for a fair evaluation of which system would be most suitable for their individual requirements.

I noted that the address for StereoVision was inadvertently omitted from the article. Although technically they are in competition with each of the companies mentioned, including my own, they are highly regarded in the industry and I respect their efforts in the advancement of stereocinematography. As such, I feel they should be included in the listing. Their address is: StereoVision International, Inc., 3421 West Burbank Boulevard, Burbank, CA 91505.

I wish to thank you for the inclusion of some of my photographs, both flat and stereoscopic, as illustrations accompanying the article. It may interest some of your readers that while the analogic system is quite suitable for applications such as stereo images on the printed page, much higher quality results may be achieved through use of polarized light systems in the motion picture and television.

Quo Vadis 3-D? Widescreen 3-D motion pictures with a realism and potential for fantastic special effects undreamed of only a few years ago. That is where 3-D is going. As the saying goes, it is coming soon: watch for it.

John A. Rupkalvis
StereoScope
Minneapolis, MN

MOONING THE U.N.

... On the subject of the Moon Treaty: So the U.N. feels that it can claim the solar system. What do they want to spoil next, the stars?

Perhaps we would-be space pioneers will have to use a system utilized by the early Americans. It's called squatting. I just happen to have my eye on a little spot near Solis Lacus and...

Charles W. Wilkinson III
Oxford, NC

ROCKET TO RUE MORGUE

... Has it occurred to you that a space funeral service is a real and profitable possibility?

It could start out with someone renting a shuttle Getaway Special for \$10,000. This person then sells space to those wishing to have their ashes put in space. There could be room for 100 ash containers or more, making the space voyage part of the funeral cheap as funerals go. A lot of Getaway Specials might be sold, since plenty of customers are bound to show up in so populous a world.

When space colonists and then interstellar travel come about, this sort of service may develop many interesting options. It may also become a huge enterprise—as long as people keep on dying.

Harley A. Goodman
Rocky Point, NY

A REAL BUCK-UP



... The poltergeists have struck your photo department.

While it is true Jamie Lee Curtis did appear in an episode of *Buck Rogers* this season, it is also true the photograph captioned as being Ms. Curtis in the "25th Century Style" article (FUTURE LIFE #18) is Brianne Leary.

Just out of curiosity, what did the Curtis photograph look like?

Maureen Holdridge
Plattsburgh, NY

BRAVE NEW DEJA VU

... I've just finished watching *Brave New World* and I praise NBC for finally showing it, even if it was shortened by 50 minutes or so. Having never read the novel or even heard of it before seeing the article in FUTURE LIFE, I cannot lament the unseen film. So be it.

What I'm writing about is the fact that the roots of this mechanized, bland society, so brilliantly portrayed on the screen, are present now. I have seen it and was shocked by it and am now even frightened by it.

I've just finished three years in the Navy and was discharged early, before my enlistment was half over, due to my inability to adjust to the military society. Upon reflection, after seeing *Brave New World*, I am now glad to have been rejected by that society and would have been ashamed to be recognized as part of that society if I were still in it.

Promiscuity, drug abuse and an acceptance of violence and lawbreaking is considered normal and anyone who rejects these concepts is abnormal. The foundations of the *Brave New World* have already been laid.

Jack A. Biggs, Jr.
Alvarado, TX

NO STARS IN HIS EYES

... What is this cat barf about going to the stars? Now, I'm an almost total science and science fiction nut and find starships and star travel fascinating, but I also like to be sensible. I figure that there is no logical reason for mankind to explore the nearby stars when the things we would be looking for are far closer to home.

If we are looking for planets of Jovian mass and smaller we may have to take potshots, a very expensive procedure. If we want planets to explore and examine, our solar system has several, not to mention a few dozen fair-sized satellites, three planetary ring systems and who knows how many comets.

If we are looking for life, the nearest single G-type star is Tau Ceti, which is 11.95 light years away. And the odds it just happens to have a proper sized planet inside the star's ecosphere made up of just the right compounds needed for life to form are pretty slim. If we want to look at different stars, a large space telescope can do that quite well.

Karl Johnson
Victoria, BC, Canada

SEARCHING FOR STARSHIPS

... Thanks for an interesting article on "Real Starships" (FUTURE LIFE #17). I'd just like to point out that the design of the spacecraft in the illustrations on page 55, from the covers of the April and May 1954 issues of the British *Authentic Science Fiction* magazine, was "borrowed" (without acknowledgment) from the 1951 designs of the late R.A. Smith of the British Interplanetary Society.

The craft was actually intended as an ion-drive, deep-space vehicle for use in our own solar system. It can be found, along with dozens of other early Smith designs and paintings, in the fascinating new book *High Road to the Moon* by Dr. Bob Parkinson, available only from the B.I.S. (27/29 South Lambeth Road, London SW8 1SZ, England), price \$15.00 (£ 6.00).

David A. Hardy
Birmingham, England

ONWARD AND UPWARD

... I am only ten years old, but I faithfully subscribe to FUTURE LIFE. And so far, I have noticed that a lot of people want to live in outer space in space stations, etc. I have just one comment. *Charge!* When are we going to learn that President Carter is more interested in selling peanuts than getting us into space? And that Ted Kennedy doesn't have what John F. did? Everybody thinks that they can wait till somebody else gets up there, then go. If our government was more interested in NASA than shlocking around with Iran, that would be fine. What do you think happened to the space shuttle? Carter sent it to the same place the dodo bird went.

So one of you smart *grownup* people just do me a favor, alright? Start a fund and wait till you get enough money to build a spaceship, then *build it*. And when you do, keep me posted. I'll donate too.

Jeremy Cohen
West Caldwell, NJ

HEINLEIN TO STERNBACH

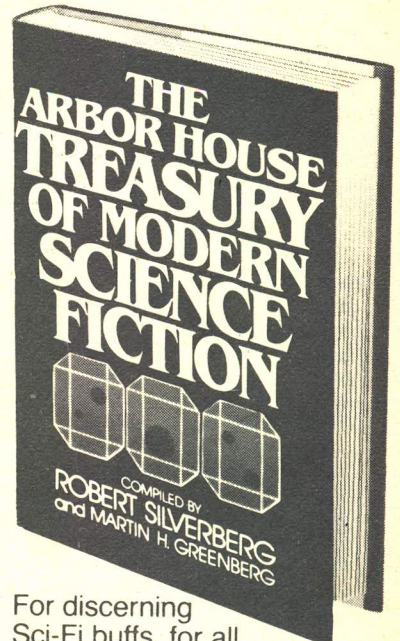
... I was very flattered by your mention of me as Rick Sternbach's mentor (FUTURE LIFE #17), but I can't really say that I "championed" him. He was good, and I merely brought his work to the attention of Ben Bova. Rick took it from there. I was merely following the dictum of Robert A. Heinlein who once told me when I asked him what I could do to repay him for the time and effort he spent in coaching me, "The obligation is always forward, never backward. You must do the same for the next generation. That is the only way to repay *any* of your teachers, mentors, or those who help you." I am very pleased that I was able to give Rick a boost when he needed it. But you can thank Robert A. Heinlein for that, among other things.

G. Harry Stine
Phoenix, AZ

SOMETHING BORROWED

... Somewhere I read or heard the phrase "the future is yesterday." The reason I'm quoting this

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ARBOR HOUSE

phrase will become apparent shortly.

While reading about the rocket engine firefighting pumps in the article on space spin-offs (FUTURE LIFE #18), I was reminded of something I'd read in the Peenemunde chapter of Willy Ley's book *Rockets, Missiles and Men in Space*: "As Wernher von Braun told me later, he described the requirements for the pumps to the staff of a pump factory with a little trepidation. He expected protestations that these demands were impossible. Instead everybody listened in silence and when the pump experts finally opened their mouths they said that this was a firefighter's pump. The requirements were about the same. Simple construction, quick action, delivery of a large volume of water and constant delivery pressure. . . ."

It would seem that the application of rocket engine pumps to firefighting brings the situation full circle.

Franklin Ratliff
Maitland, FL

LOUDER, PLEASE

...While reading the Input section in FUTURE LIFE #17, I noticed a letter that interested me very much. It was entitled "Making Space Happen" and explained how some readers of FUTURE LIFE are rather quiet about their ideas relating to space travel and the conquest of space.

I agree 100 percent with the writer of the letter. People today are so closed. They just don't let themselves spread their thoughts to one another. How is something going to be done about space if

we can't even talk about it?

I'll admit that it's a giant step to start living in space but if we start out with small projects such as building a small space station orbiting the Moon and then move up to building homes there, who knows, maybe it will snowball!

So all the FUTURE LIFE readers out there that have ideas for the conquest of space keep thinking them up and let other readers hear them or else we'll never get off the ground.

Curt Reeder
Westford, MA

MCCALL MAVEN

... I just finished going through FUTURE LIFE #16 and was extremely impressed by your article on Robert McCall. Mr. McCall's works have always impressed me and I was overjoyed to discover the background on him and his works.

Robin Martin
Topsoil, Newf., Canada

BERKEY'S CITIES

... In FUTURE LIFE #13 you featured an article about John Berkey. According to the article, Berkey painted a series of futuristic cityscapes for the Otis Elevator Company's "The Future Is. . ." ads. I am most interested in his work that showed a futuristic entertainment complex/marina with a city of buildings in the background.

Could you direct me to the person or firm where I could obtain these reproductions?

Clifford W. Moy
Silver Spring, MD

For information on how to obtain copies of John Berkey's "The Future Is. . ." ads, write to The Otis Elevator Co., 1 Farm Springs, Farmington, CT 06032, Comm. Dept. #520EW.

ABORTED OPINIONS

... Pertaining to your Output "Primitive Force" column in FUTURE LIFE #18, it is apparent that you are for abortion. I ask you, what penalty do women pay for giving birth? All it is, is a little pressure before birth and then it's over. Why kill something as beautiful as a child in its embryonic stage? The child already has arms, legs (short as they may be), a heart, a brain, etc. and it is being fed internally by its mother—so it is human and *alive*. And who says the mother has to keep the child—there are thousands of couples all across North America who pray for a baby but can't have one. Basically all it comes down to is a few months of inconvenience for the pregnant woman. We should be happy our parents didn't decide to abort *us*.

Jerry De Luca
Montreal, Que., Canada

... For the most part I agree with the stands taken by the publishers and editors in FUTURE LIFE. However, the Output column entitled "Primitive Force" in FUTURE LIFE #18 was the exception. Mr. O'Quinn's thinly veiled stand on abortion outraged me so much that I have lost enormous respect for what is otherwise a fine magazine. How can anybody say that it is evil to force pregnant women to give birth to their children? Didn't anybody take into consideration the rights of the unborn child? Is it because the child is in a womb, unable to speak for itself or plead its case that its life is considered unimportant? If this is the case, then newborn children who are unable to take care of themselves should also be considered expendable.

The fact is that upon the moment of conception that child is a human being, and as such it is entitled to be given a chance at life. Mr. O'Quinn may not realize it, but what he is condoning is state-run murder of innocent children, just because some woman doesn't want to go through nine months of inconvenience.

For every child that is *murdered*, we could be losing another Einstein or Curie. Abortion laws are not there to punish "evil doers" as Mr. O'Quinn seems to think but to protect those who are too young to protect themselves!

Kevin Holden
Fredericton, NB, Canada

... In response to your May editorial I submit that I, too, am an optimist concerning the development of the human race, but I envision the father-son dialogue a bit differently:

"Dad, is it true that in ancient times the rulers used to allow women to kill their unborn children just because they didn't want them?"

"I know it's hard to believe, son, but there were actually people who felt that an unborn wasn't really human and deserved no protection or consideration."

"But why? Was there no method of birth control?"

"Birth control they had—what they lacked was *self control*."

"But didn't some of their moral leaders speak up and say that such murder was evil?"

"Well, son, a few did, but they were generally ignored by a population which was far more interested in the immediate mindless gratification of every desire, regardless of consequences. Many felt that sex was for pleasure and to be thoughtlessly indulged in within any casual relationship. I know this sounds silly to you but I'm not making this up."

"I don't understand why they gave so little thought to where such irresponsibility would lead them."

"Well, eventually they did, of course, or we wouldn't be here today. They finally figured out what history had been trying to teach them for several thousand years: that the *family* is the only stable foundation which society has ever had or ever will have, and when a society contributes to the breakdown of that vital unit by allowing or even condoning promiscuity, homosexuality and blatant egocentrism, it will not long survive."

"But why didn't government leaders *force* them to act responsibly?"

"They tried, rather unsuccessfully, on several occasions, but soon discovered the truth of the adage that you can't legislate morality. Too, the idea of using force in such a personal matter was properly considered repugnant. They gradually understood that only by beginning in childhood and consistently teaching correct principles in the home could they educate a society to a truly high order of civilization. Along the way, thousands of innocent unborn children paid with their lives for the shamefully selfish ignorance of that generation. Overcoming *that* is one of the most important ingredients of a rational world."

Dan Gawthrop
San Jose, CA

OOPSKI

In the Space International article which appeared in FUTURE LIFE #19, we neglected to credit the photos of the Bulgarian and Polish cosmonauts to the collection of James Oberg.



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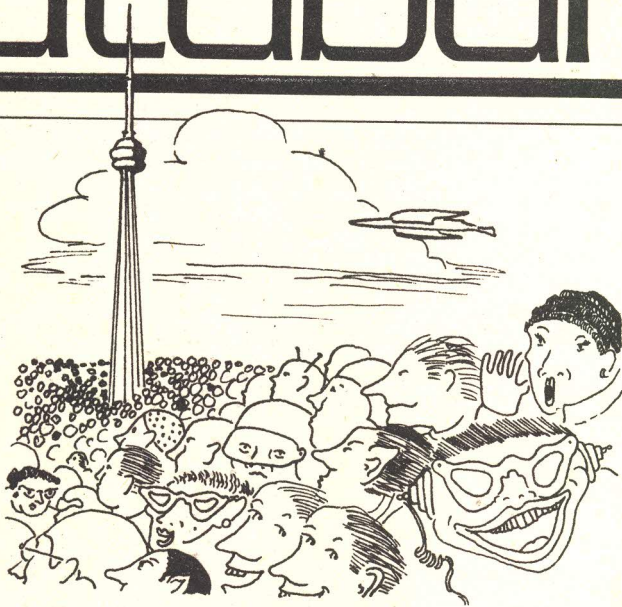
TOMORROWCON

FUTURISTS LINK UP TO ANTICIPATE '80S

Scientists, sociologists, futurists and people simply interested in the outlook for the human species will be congregating in Toronto on July 20th for the First Global Conference on the Future. Organized jointly by the World Future Society and the Canadian Futures Society, the conference has been subtitled Through the '80s — Thinking Globally, Acting Locally.

"I am persuaded," writes Maurice F. Strong, honorary conference chairman, "that we are in one of those seminal transition periods in human history. The way in which we deal with the issues will determine the direction in which this transition will take us. At this point, I believe its outcome is not pre-determined. Most of the basic forces which are shaping our future are the result of human actions and human failures. In a very real sense, then, we are today in command of our own evolution."

Some 21 topics of interest will be discussed during the conference, and in order to help deal with the issues involved, the organizers have divided them up into three categories: Human Concerns, Global Concerns and Management Concerns. This again reflects part of the conference theme



ART: LEIGH GRAU

— the idea that we can solve our problems more efficiently by approaching them at more localized levels. "All too often," asserts Strong, "there is a great tendency to try to elevate every issue to the global level for its solution. The danger in talking about problems on a 'global' basis is that we will lapse into 'thinking' that all solutions to them can only be mounted at the global level. There are many global problems in the sense that they can only be fully understood and addressed in their global context; there are few global solutions! Most of the 'actions' required to deal with these problems must be taken at the 'local' and national levels — within a global

context."

Within these categories, the speakers will cover such topics as: World Food: Will There Be Enough?; Human Values and Religions; Availability of Natural Resources; Energy: The Current Dilemma; Science and Technology; Environmental Quality; Social Disorganization; and Business Trends and Directions. Hundreds of leading scholars and experts are expected to address the conference, including: Lester Brown, president of the Worldwatch Institute; Edward Cornish, president of the World Future Society; Barbara Hubbard, director of the International Commit-

tee for the Future; Herman Kahn, director of the Hudson Institute; artist Magda McHale; consumer advocate David Schoenfeld, and author Alvin Toffler.

In addition to the lectures and workshops scheduled, various other special events are planned for attendees. A special area will be set aside for the display of social and technological inventions. There will be a book display, book store and "meet the author" sessions; continuous film showings; a manpower exchange for those interested in finding either employment or employees in the futures field; luncheons featuring speakers from the conference; and pre-conference seminars to help familiarize newcomers to the field.

The First Global Conference on the Future will take place July 20th through the 24th at the Toronto (Harbour Castle) Hilton and will be one of the major events of the decade for anyone interested in futurism. Full registration to the conference for members of the World Future Society is \$125 before June 30th and \$140 after; for nonmembers, \$145 before June 30th and \$160 after. For complete information about registration and accommodations, contact the World Future Society, 4916 St. Elmo Avenue, Washington, D.C. 20014; telephone: (301) 656-8274.

—Barbara Krasnoff

CELESTIAL CINEMA

SPIELBERG AND LUCAS TAKE TO THE SKIES

Steven Spielberg and George Lucas, currently working on a collaborative effort, *Raiders of the Lost Ark*, will return to the science fiction fold in a big way in 1981. Spielberg will reportedly once again turn his vision to the heavens and produce yet another UFO extravaganza, as yet untitled. The prolific filmmaker who, two years ago, brought forth the dazzling *Close Encounters of the Third Kind* will act as producer on this effort, handing over directorial reins to famed SF artist and designer (*Alien*, *Conan*) Ron Cobb. Scripting on the project has yet to begin but, at

this point, it looks to be a collaborative effort between Spielberg, Cobb and writer John Sayles (*Battle Beyond the Stars*, *Return of the Seacausus Seven*). A winter 1981 release date is being bantered about. Spielberg promises a thought-provoking and eye boggling finished film.

Lucas, once finished with *Raiders*, will once again serve as executive producer for a *Star Wars*-related project. The third chapter in the Warsian trilogy, entitled *Revenge of the Jedi*, will begin pre-production in January, with long-time Lucas associate Gary Kurtz acting as producer. The film will take up where *The Empire Strikes Back* leaves off, following the adventures of Luke Skywalker as he tries to rescue hapless Han Solo from the clutches of space mercenaries.

—Ed Naha



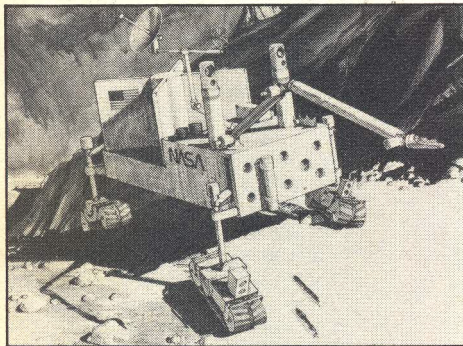
PHOTO: © 1977 COLUMBIA PICTURES

ROVING ROBOTS

ONE SMALL STEP FOR HUMANATION

The human in future space ventures may be replaced by a population of self-breeding robots, weaned upon extraterrestrial resources, spreading across the solar system and throughout the universe.

This picture of replicating machines marching about the cosmos isn't drawn from the mind of a science fiction aficionado; it comes straight from NASA administrator Dr. Robert Frosch.



Where no man has gone before... intelligent machines like NASA's Mars rover will forge the way for human exploration of the solar system. Will they delay human entry into the cosmos?

In a speech before the Commonwealth Club in San Francisco, the top NASA official outlined a plan to establish a "productive machine economy" by using our mechanized brethren to build Earth orbiting industries, Moon and planetary bases, including space colonies.

"The key to this idea," stated the administrator, "is the construction of a machine which either totally automatically, or with minimal human intervention and guidance, can use solar energy and local materials on the Earth, or on the Moon, or on an asteroid or elsewhere, in the solar system to build a

replica of itself."

Generation after generation of machines would then follow, added Frosch, with the total quantity of machines growing exponentially, just as biological generations grow.

Emphasis on nuts and bolts over flesh and bone is partly based on findings of a NASA/Jet Propulsion Laboratory (JPL) study team. In its investigations, the group came to the conclusion that future space operations should rely heavily on machine intelligence and robotics. Not only are long voyages to the planets likely missions for robots, but near Earth operations should be considered as well.

According to Dr. Ewald Heer, organizer of the study, "Without additional automation and increased productivity in the space program, we will not be able to do many of the things we are contemplating."

Will robotics "de-humanize" space, lessening the need for us mortals? "We will not be able to replace the human," claims Heer. "However, we can enhance many human functions, placing individual workers in more supervisory roles."

—Leonard David

LEMON AID

PUCKER POWER

Anthony Ashill, a British watch repairman, has added a new twist to the search for alternative energy sources: He found a way to get more than one kind of juice from a lemon.

Connecting two wires to pieces of zinc and copper, a lemon and a motor, he hoped the acetic acid in the

fruit would react with the metals to produce electric current. It did, and Ashill ran the motor several months on lemon power.

"It has amazed me how much juice there appears to be in a single lemon," he told the *London Daily Telegraph*.

Although you may think you already have a lemon under the hood of your car, battery makers say this fruit-ty method of making electricity won't work for autos. It would take too many lemons.

—Allan Maurer

ASTRONOMY

EINSTEIN AND THE X-RAY BURSTERS

Something mysterious is going on in the globular star clusters—or at least, in some of them. These clusters, which surround the galactic core like a halo, are the oldest known objects in the galaxy. They often contain over a hundred thousand stars, concentrated in a core.

Of the 130 globular clusters known, eight contain powerful X-ray sources—not surprising in itself. However, six of these sources are bursters which "explode" at irregular intervals, releasing more X-ray energy in a few seconds than our sun does in weeks. Yet such short bursts must come from the area less than 50 kilometers in diameter. What could produce so much energy from such a small area? Two possibilities have been suggested: instabilities in the flow of gas

toward a massive black hole, or an H-bomb-like explosion due to the infall of gases from a normal star onto a neutron-star companion.

The orbiting High Energy Astronomy Observatory 2, better known as Einstein, may help us decide between these possibilities. With this observatory we can, for the first time, take high-resolution pictures of X-ray sources (in fact, it happened to be taking pictures of the global cluster Terzan 2 when a burst occurred). From these pictures we can tell whether the X-ray source is near the center of the cluster—a black hole, as the heaviest object in the cluster, will "sink" to the center, while a neutron-star binary won't. Unfortunately, as so often happens in scientific research, the initial results are ambiguous. One source is almost exactly at the center, another is nowhere near it, and the others so far studied are in between. The mystery of the X-ray bursters is thus still a mystery.

—W.A. Thomasson

IMAGINARY VOYAGES

SF ART ON VIEW

Science fiction art, considered by many to be simply a sideline of the genre, is finally coming to public attention. One of the first major museum exhibitions to focus on the history and development of science fiction illustration is now on view at the Bronx Museum of the Arts in New York City.

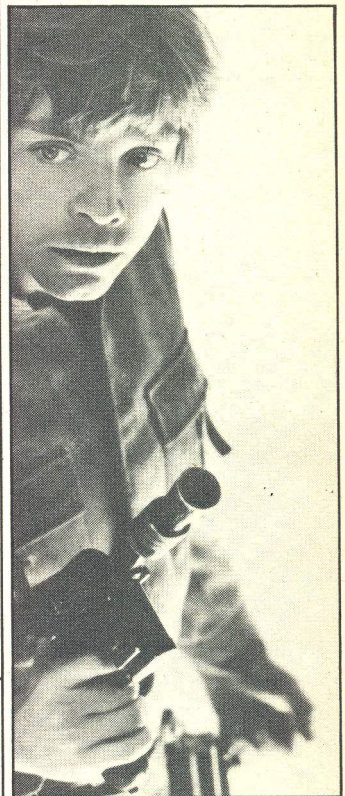
The show focuses on the history of SF art, from the green monsters and scantily clad space maidens of the 1920s pulps to the realistic space-scapes and abstract alien worlds of today. Early artists such as Hannes Bok, Alex Schomburg, Earle Bergey and pioneer space artist Chesley Bonestell are included; and there is also representative work by such modern SF artists as Ron Miller, Vincent Di Fate, John Berkey, Ludek Pesek, Denise Watt-Geiger, Chris Foss and others, including Karl Kofoed, who is featured in this issue's Portfolio. Finally, a section of the exhibit highlights artists from the fine art world whose work is derivative of or influenced by science fiction. There is also a slide show and a series of special events through the summer.

The exhibit, titled "Science Fiction: Imaginary Voyages," will be at the museum until August 29th. For more information, contact the Bronx Museum of the Arts, 851 Grand Concourse, Bronx, NY 10451; (212) 681-6000.

—Barbara Krasnoff

SCI FI RADIO

STAR WARS ON THE AIRWAVES



Don't touch that dial, Vader!

Darth Vader's rumbling voice will be heard on National Public Radio (NPR) when *Star Wars* hits the airwaves in a 13-week series tentatively scheduled for this October. The series will be heard on most of the 230 NPR member stations via satellite.

The *Star Wars* series, which will originate on NPR's Los Angeles station, KUSC, is another indication that radio drama is enjoying a resurgence of interest, with science fiction shows leading the way. Once the most popular entertainment medium in America, radio drama faded from the airwaves almost without a murmur, when television stole its listeners in the 1950s.

With *Star Wars*, however, there will be at least three radio drama programs in syndication this year. "CBS Mystery Theatre," which has been around for a while, dramatizes mystery and horror classics such as *Dr. Jekyll and Mr. Hyde*, *Dracula*, *Frankenstein*, and others, as well as airing original stories, some of which are science fiction. In addition, a program called *Alien Worlds* that airs weekly original SF dramas should soon be playing in some radio markets.

Who knows what evil lurks in future shows?

—Allan Maurer

MUTANT MENACE

SCANNERS SEND SHIVERS

Scientific mutation is one of the most time-honored themes in the cinematic realm of science fiction and horror. Incredible beings that shrink or grow, melt or glow, have been the staple diet of SF-shock buffs for over three decades; with very few of the films offered deviating from the well-worn path of formulaic exploitation. Next year, however, *Scanners* will arrive and the field of scientific mutations may never be the same.

Scanners is the brainchild of David Cronenberg, a young "new breed" writer/director who specializes in bringing ghastly new twists to the stereotypical storyline of mutant menace. His first three movies, *Shivers*, *Rabid* and *The Brood*, placed the scientific element in the background as a firm foundation for the movies' star attractions, clinical grotesqueries. However, *Scanners*, planned for release in January, 1981, has a greater accent on its science fictional elements.

The story concerns the reaction of planet Earth to the discovery of "the

PHOTO © AVCO EMBASSY PICTURES



In David Cronenberg's *Scanners*, a new breed of humanity, equipped with psi-powers, has the potential to either elevate or destroy civilization. Here, scientists prepare for contact.

next step in human evolution" on the planet. A new race of humans with powerful telekinetic abilities is found alive and well and living on Terra: a society of 248 Scanners dispersed around the globe. Two opposing forces mobilize to gather up the PSI-powered humans: one that would use their powers as the ultimate weapon, the other to benefit humanity.

Cronenberg is delighted to finally alight in a science-oriented area. He is fascinated with the concept of science gone haywire. "It's an entertaining premise," he says, "which takes the viewer from the real world as quickly as possible into a world of nightmare

reality and dream logic, which is where I like to function."

A budget approaching \$5 million (more than all the previous Cronenberg films combined) has allowed the director to spend much more lavishly on stunts and effects—both mainstays of his past films—and to cast Patrick McGouhan (TV's *The Prisoner*) in the lead role as a psychologist determined to gather the mutant Scanners in order to study their powers and gear them towards the betterment of the human race. *Scanners* will be released in the U.S. by Avco Embassy Pictures.

—Robert Martin

SUMMER SCHOOL

AN UPDATE ON SPACE

Once again, California State University, Northridge, is offering its annual summer course entitled "An Update on Space." This year, they have invited over 22 speakers from the aerospace industry, NASA and space organizations, including: Dr. Krafft Ehrlicke, president of Space Global, Inc.; Dr. Charles Sheffield, president of the American Astronautical Association; Gerald W. Driggers, president of the L-5 Society; and Eilene Galloway, vice president of the International Institute of Space Law. Planned topics include: the science fact of science fiction, women in space, the Moon Treaty, socio/psychological aspects of long duration space flight, mining the Moon, and the role of space interest groups in the future of space programs.

Anybody interested in attending the Update on Space program, which begins on July 14th, should contact: Dr. B.J. Bluth, Department of Sociology, California State University, Northridge, Northridge, CA 91330.

Space Settlers: An Endangered Species

An international regime declares the Moon, asteroids and planets off limits to space settlers?

The plot of a science-fiction movie?

No, it would be the consequence of a U.N. treaty the U.S. could sign any time.

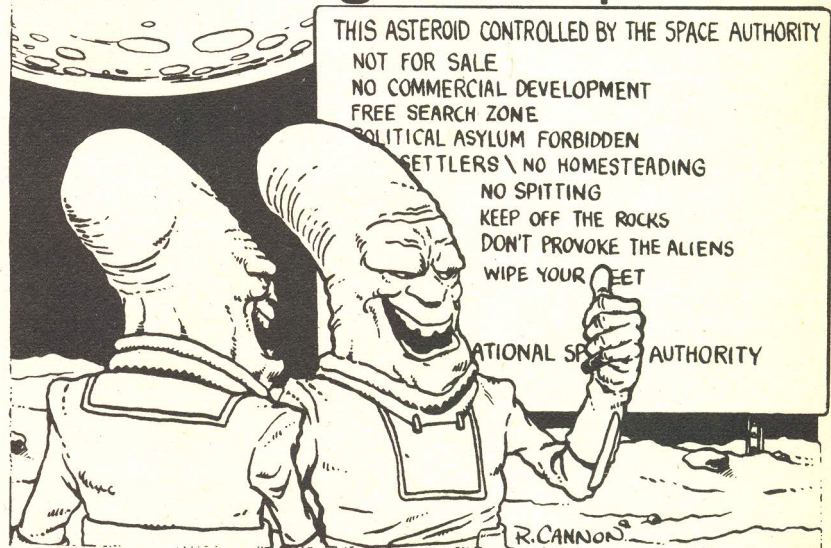
The "Moon Treaty," as the New York **Times** calls it, would:

- effectively impose an indefinite moratorium on the commercial (free world) development of nonterrestrial resources.
- impose an OPEC-like Earth controlled regime on the Moon and all other celestial bodies
- effectively prohibit individuals from owning real property
- prohibit individuals in space from obtaining political asylum or changing nationality
- open vehicles, installations and habitats to search by any Earth government of the international space regime

If it weren't for the efforts of **Future Life** (see Carolyn Henson's "Homesteading the Universe" in the Feb. '80 issue) and the L-5 Society, this treaty would have already been signed into law, and the endless frontier would have been closed before it was opened.

Please join with us today in this historic battle to preserve our right to pioneer space. Donors of \$5.00 or more will receive a copy of the treaty and four pages of comment; \$20.00 and up will receive the above plus sixteen pages of analysis; \$50.00 and up will receive the above plus a year subscription to the **L-5 News** (regularly \$20.00).

This ad provided AS A public service by **FUTURE LIFE** MAGAZINE.



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ESP PHD

PARAPSYCH PROF

From California (naturally) comes news of the first accredited Ph.D in the field of parapsychology. John F. Kennedy University, which is the only American institute of higher education which offers accredited Bachelor's and Master's degrees in the subject, will award the degree to faculty member Jeffrey Mishlove.

Mishlove says that he first became interested in parapsychology when he began "having psychic experiences myself: simple kinds of ESP, precognitive dreams, experiences that at the time seemed telepathic. I realized that I'd have to find my own answers. To understand the experiences I was having, I would have to become an expert myself."

While some might wonder what type of dissertation one would have to produce in order to win a Ph.D in parapsychology (read Carter's mind, maybe?), Mishlove has handed in a hefty 600-page document entitled "Psi-Development Systems: Disciplinary Matrix for History, Theory, Evaluation and Design," in which he evaluates various ancient and modern

methods of training psychic abilities.

"My work ultimately involves what I hope will be a new cultural paradigm which sees reality as neither exclusively spiritual nor exclusively material," Mishlove says. "Parapsychology is the science that integrates the physical and the religious world views, and it does so on the basis of rationality. We've seen parapsychology grow over the past 100 years. Cultural shifts take hundreds of years, and I see the work that I'm doing as part of a process that is going to take time. I expect that in my lifetime, the type of work that we are doing at JFKU will play an important role in the continuing cultural transition."

Parapsychology is not the only program in JFKU's Graduate Program in the Study of Consciousness. They are also offering courses in such mind-bending subjects as Consciousness and the Arts, Comparative Mysticism, Transpersonal Counseling and, new this fall, Holistic Health Education. Anyone interested should contact Mary Kay Wright-Malear, John F. Kennedy University, 12 Altarinda Road, Orinda, CA; telephone (415) 254-0200 ext. 47.

—Barbara Krasnoff

MOOD MUSIC

SUITE FOR ALTERED STATES

One of this fall's more controversial films will undoubtedly be Ken Russell's widescreen version of the Paddy Chayefsky novel *Altered States*. The film has already made headlines because of the row between Russell and Chayefsky. The author wants his name taken off the credits because of Russell's *unique* treatment of the storyline: a plot which details a scientist's experiments with hallucinogenic drugs and human evolution.

The film's soundtrack will also be slightly out of the ordinary according to composer John Corigliano, best known for his work in the classical music realm (he has been commissioned to write the opera that will mark the 100th anniversary of the New York Metropolitan Opera in 1983). Whereas most films treat their scores as one of the last possible additions to the production, *Altered States* has taken its melodies very seriously from the start. Russell met with Corigliano late last fall after seeing him perform a clarinet concerto with the Los Angeles Symphony Orchestra.

"He showed me some rushes and I saw that it was not a stereotyped sort of production," Corigliano recalls, "so I agreed to score it. There are long sections of the film without dialogue, in one case more than 12 minutes, in which the music provides the entire

narrative emphasis."

The scoring turned out to be a Herculean effort. The finished work runs 286 pages long, translating into 75 minutes of playing time. And what can film fans look forward to musically in *Altered States* as a result of Corigliano's work? According to the composer, the soundtrack will be "terribly difficult, eclectic, far out, abstract, wild and have tremendous energy." Oh sure, but can you dance to it?

—Sam Bisbee

COST OF LIVING

THE TEN DOLLAR MAN

A decade ago, comedians sometimes quipped that a human being is worth less than a dollar—in terms of the chemicals that the human body contains, that is. Inflation has changed all that.

Worth about 98 cents in 1969, the chemicals and minerals in a 160-pound human body would sell for about \$7.25 today, give or take a few cents. "If this keeps up," said a Chicago medical school professor, "we'll soon have the ten dollar man."

While most of the human body is water, the average 160 pounder also contains approximately five pounds of calcium, one and a half pounds of phosphates, nine ounces of potassium, an ounce of magnesium and traces of other minerals.

So if a carnival fortune teller says your personal worth is rising . . . ask for an explanation. —Allan Maurer

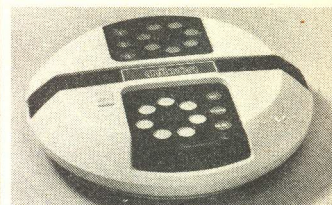
GROWNUP GAMES

ELECTRONIC TOYS

The latest additions to the electronic toy industry were unveiled last February by Milton Bradley Co. at the 77th Annual New York Toy Fair. Their most impressive new item is a game that actually talks. However, unlike the dolls and other talking toys of yesteryear, this new game does not rely on records or tape to supply its voice. MB Electronics' Milton has its voice electronically produced through a "speech chip." As a result, Milton's voice is somewhat like that of a computer in a science fiction movie.

Shaped like a flying saucer, Milton has two touch-sensitive sets of ten buttons on each side, seven of which are used in the performance of the game. When pressed, these two sets, color coded red (top) and yellow (bottom), signal Milton to recite part of a hidden phrase. For example, a red button commands Milton to say, "Call the . . ." By a process of elimination, players must find the button on the yellow board that will produce the end of the phrase, "doctor." The one who gets the most correct phrases wins.

Pressing a button, though, does not always make Milton talk. He's very impatient and if you stop at all during the game, he'll start to heckle you and remind you whose turn it is. If you pick a wrong phrase like, "Flush the . . . doctor," Milton will comment, "Garbage!"



Saucer-shaped Milton game

Powered by AC current from wall outlets, Milton requires no batteries and will retail for \$55.

Another new game from MB Electronics is Omni, which is described as "a high technology state-of-the-art home entertainment console." It resembles a somewhat highly advanced version of 2-XL, the robotic toy that uses 8-track cartridges to ask questions pre-recorded onto the tapes. Depending on the player's answer, 2-XL switches to a track with an appropriate response.

The Omni console has four keyboards with ten buttons each. The upper half of the I.D. plate for the buttons is labeled A to Z and the lower half 0 to 9. While 2-XL's questions are limited to yes/no, true/false or multiple choice, Omni requires you to spell out the answer.

Adding to the game's excitement, many of the 8-track game cartridges features celebrities asking the questions and giving the answers. Pat Sommerall gives the sports quiz and Vincent Price covers TV and movie trivia.

Like Milton, Omni also works on house current and will retail for about \$100.

—David Hirsch

GIFT OF GAB

TOYING WITH SCIENCE

Several years ago, Stephen King, author of *Carrie*, *The Stand* and other spooky best sellers, wrote a slick little science fiction story called "Battleground." Collected in his book *Nightshift*, the story describes the battle a syndicate hit man fights against a squad of toy soldiers sent to him by one of his victim's inventor friends.

While science may not have completely caught up with the gruesome science fiction of King's story, the *Los Angeles Times* reports that it's getting close. According to the *Times*, toymakers are working on toy soldiers that will fight complicated battles at the verbal instructions of a child.

Also on the drawing boards are dolls that will carry on conversations with a child, responding to questions with appropriate answers. New computer chips, able to hold 64,000 bits of information, are already on the market, and even more powerful chips are being developed. These will make it

possible to program increasingly sophisticated toys, inventors say.

The talking dolls, for instance, can be made to speak in much clearer voices than the scratchy, limited versions currently available. Both the dolls and soldiers could also be programmed to respond to only one voice, that of the owner.

While these sophisticated electronic toys are proliferating, an old standby, chemistry sets, are disappearing from the market place. *Chemical and Engineering News*, an industry trade magazine, says many companies which used to make the sets have stopped. Although one reason is that the number of children between the ages of nine and 12 is declining, inflation is the prime culprit.

Would-be mad scientists—or sane ones—used to have their choice of elaborately stocked multiple cabinets with racks of test tubes, chemical scales, flasks, beakers and other scientific apparatus. Nowadays, a similarly priced set would contain only half the chemicals and fewer tools.

Sounds as if children of the future will be learning more about war than science.

—Allan Maurer

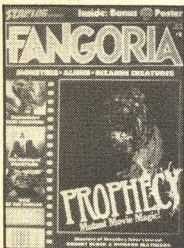
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#1—Godzilla's life on screen; *Galactica's* lost aliens; Tom (*Dawn of the Dead*) Savini; Chris Lee interview; Alex (*The She Creature*) Gordon; *ALIEN*, *Amityville Horror*, *Nightwing* and *Prophecy* previews; Don Maitz FantasticArt; Godzilla poster.



#2—Don Coscarelli on *Phantasm*; *Humanoid*, *Dracula* and *Nosferatu* previews; Richard Matheson interview Pt. 1; Making Pal's *War of the Worlds*; Robert Florey's lost Lugosi *Frankenstein*; Rouben Mamoulian on *Jeckyll and Hyde*; *Prophecy* FX; Carl Lundgren FantasticArt; *Dr. Who* villains and *Who* poster.



#3—David Cronenberg on *The Brood*; Stephen King on Kubrick and *The Shining*; Matheson Pt. 2; *Kolchak the Night Stalker* article and episode guide; Jack (*It Came from Outer Space*, *The Creature*) Arnold remembers; *Arabian Adventure*, *Tales of the Unexpected* previews; Mike Sullivan FantasticArt; *ALIEN* poster art by Barclay Shaw.



#4—Aliens of *Star Trek—The Motion Picture*; Robots of *The Black Hole*; Film femme Caroline Munro; Herschell Lewis "The Wizard of Gore"; *Invasion of the Body Snatchers*, *King Kong* and *Curse of the Demon* behind the scenes; On the set of *Salem's Lot*; Michael Hague FantasticArt; Warrior Robots from *Astro Boy* to *Voltus V* plus Robot poster.



#5—Carpenter and Hill on *The Fog*; *Saturn 3's* SF horror; Bert Gordon's *The Coming*; *Jason of Star Command's* monsters; *Galactica's* Cylon Secrets; Behind the Scenes of *THEM!*; *Son of Kong* and *Village of the Damned*; Dennis Anderson FantasticArt; Pull-Out Bonus—21" x 32" Fairies Posterbook.

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The making of an EMPIRE

George Lucas' epic *The Empire Strikes Back* is more than a sequel film. It's a new American mythos.

By ED NAHA

Creating new American myths is not an easy task. Yet, in 1974, filmmaker George Lucas unwittingly did just that. With his *American Graffiti* a box office success, writer/director Lucas began outlining a sprawling space adventure that would, eventually, result in *Star Wars*, the biggest money maker in Hollywood history. At the time, however, Lucas was only trying to assemble a "little" movie; fun in format and positive in theme.

"I took this project," he explains, "as a children's film. I thought: 'Well, we all know what a terrible mess we have made of this world. We also know, as every movie made in the last ten years has pointed out, how terrible we are and how rotten everything is. What we need now is something more positive.'"

And so, Lucas turned to science fiction as a backdrop for his idea. "I was a real fan of Flash Gordon and that kind of stuff," he

says. "And I was a very strong advocate of the exploration of space. I said, 'This is natural.' One, it will give kids a fantasy life and two, maybe it will make someone into a young Einstein. I don't think anyone is going to colonize Mars because of the technology. They're going to go because it's romantic. I thought that it was this romantic aspect of it all that needed to be looked at. Everyone had already looked at the hardware end of things."

And so, Luke Skywalker, Han Solo, Chewbacca, Princess Leia, Darth Vader, R2-D2, C-3PO and a horde of intergalactic celluloid stars were born. It took George Lucas and his friend Gary Kurtz over three years to see their *Star Wars* dreams realized. The movie made its debut in 1977, taking all of Hollywood by surprise. Ignored as a "sleeper" by the industry prior to its release, *Star Wars* was quickly recognized as a trend-

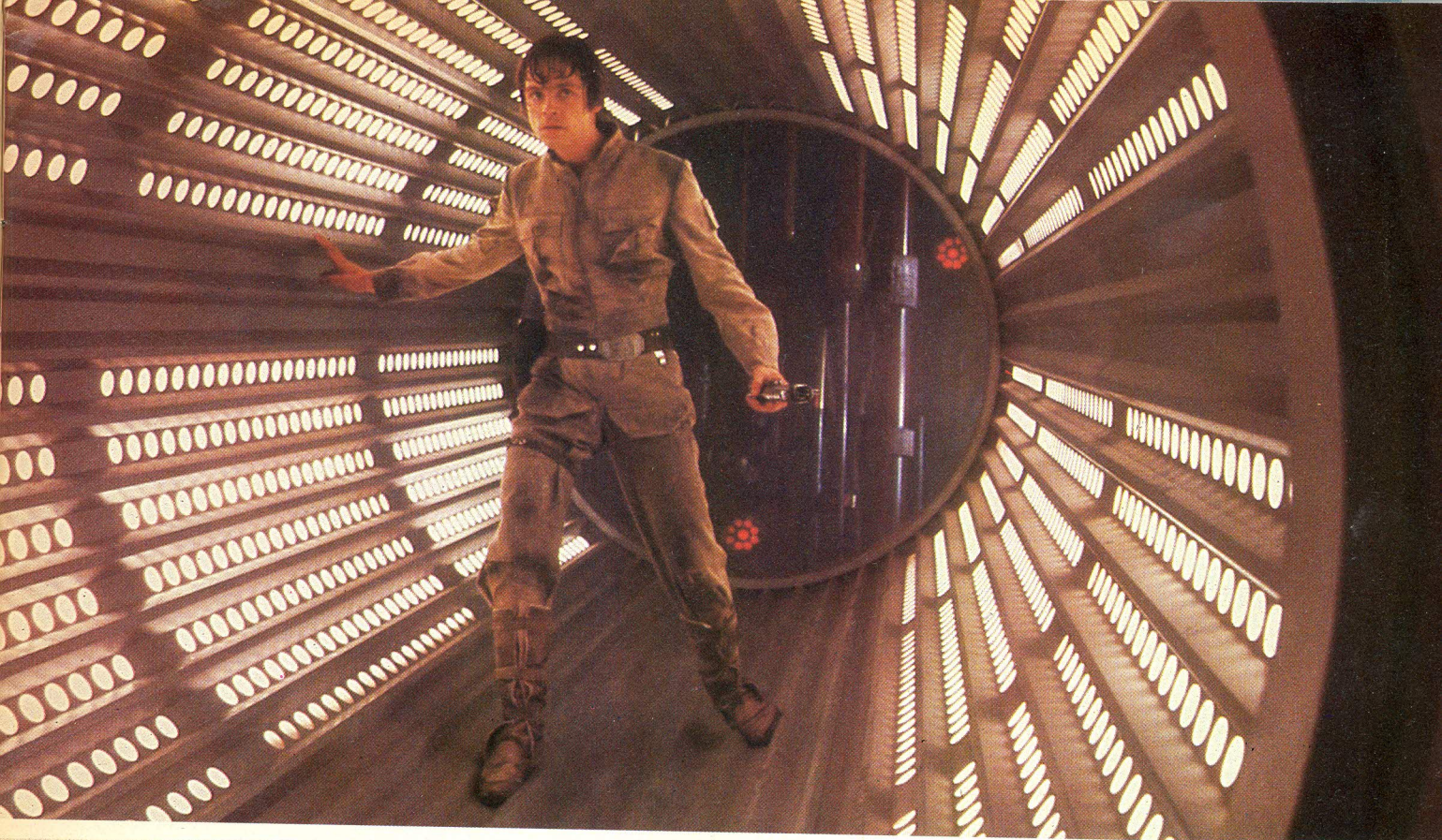
setter by studios worldwide. Not only did it set box office records within the first month of its release, it triggered a fan following unprecedented in film, with some *Star Wars* buffs seeing the production dozens of times.

As a direct result of the film's popularity, Lucas and Kurtz have seen fit to continue the adventures of Luke Skywalker in *The Empire Strikes Back*, a \$20 million "second act" of a proposed nine movie *Star Wars* series. In this outing, the villainous forces of the totalitarian Empire, once again spurred onward by evil Darth Vader (David Prowse), pursue the freedom-loving Rebels hither and yon for the course of the movie. This dangerous game of cat and mouse leads both sides through a series of strange and exotic landscapes, including the ice planet Hoth, the fog-enshrouded Bog planet and the wondrous Cloud City of Bespin. If the trials and tribulations experienced by the valiant Rebels seem insurmountable, the problems encountered by Lucas, Kurtz and crew in bringing the adventure to the screen appear positively Olympian in comparison.

The birth of *The Empire Strikes Back* actually dates back to the inception of *Star Wars*. Lucas' original concept for the first film was intricate enough to spawn several movies and, thus, only a small portion of it was filmed. There were, in essence, countless plot elements left over. "When we were making *Star Wars*," says *Empire* producer Kurtz, "we weren't actively planning *The Empire Strikes Back* at all. At one point, Alan Ladd, who was then president of 20th Century-Fox and our staunchest studio supporter, said that it would be nice if we had two stories so we could film them both at once. But that was more or less an economic response to the *Star Wars* budget, which was considered risky back then [approximately \$8 million], and the technical problems. At that point, we had nothing but George's original elaborate story

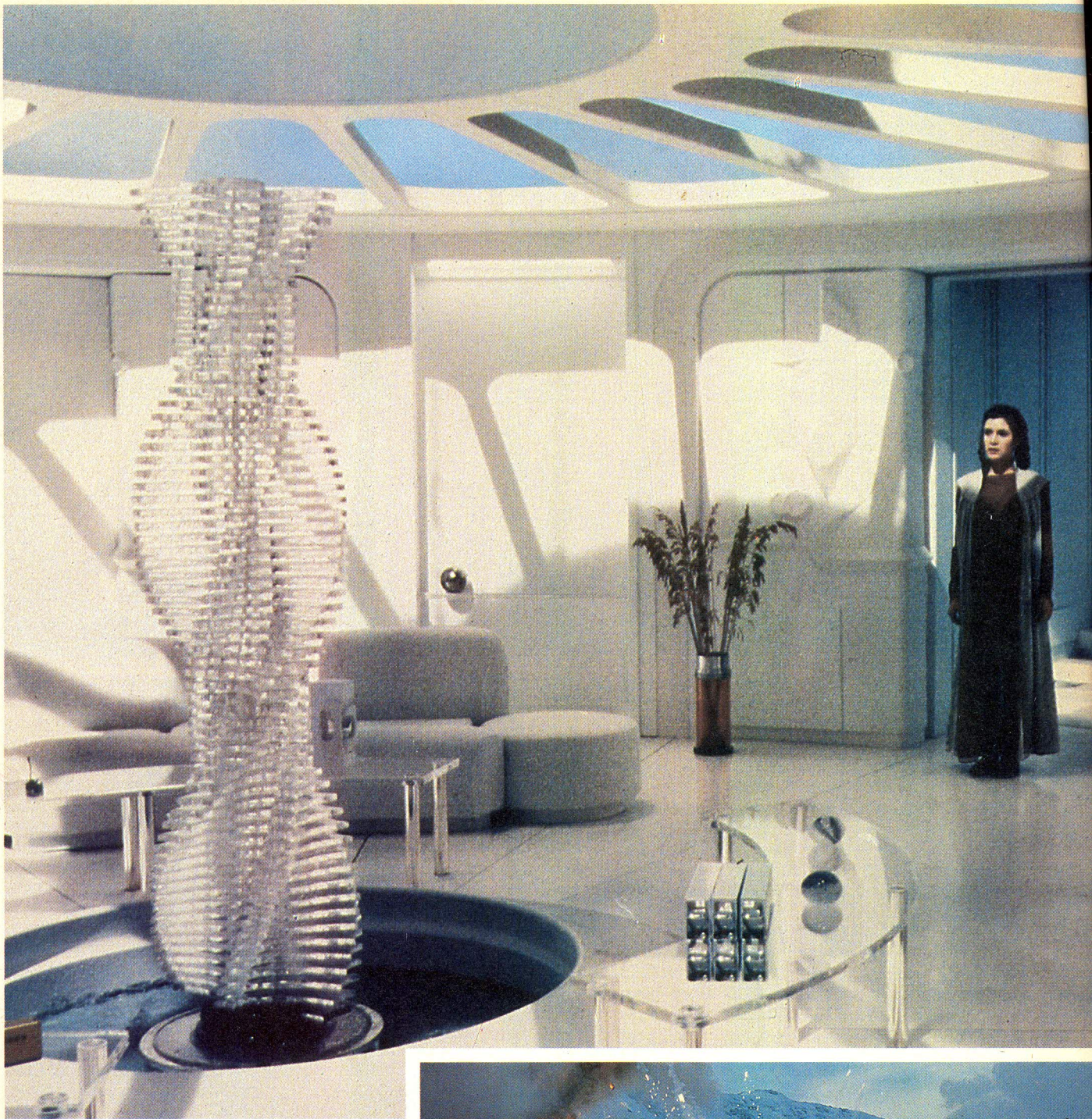


Left to right: Director Irvin Kershner, producer Gary Kurtz, executive producer George Lucas and screenwriter Lawrence Kasdan on the *Empire's* U.K. set.

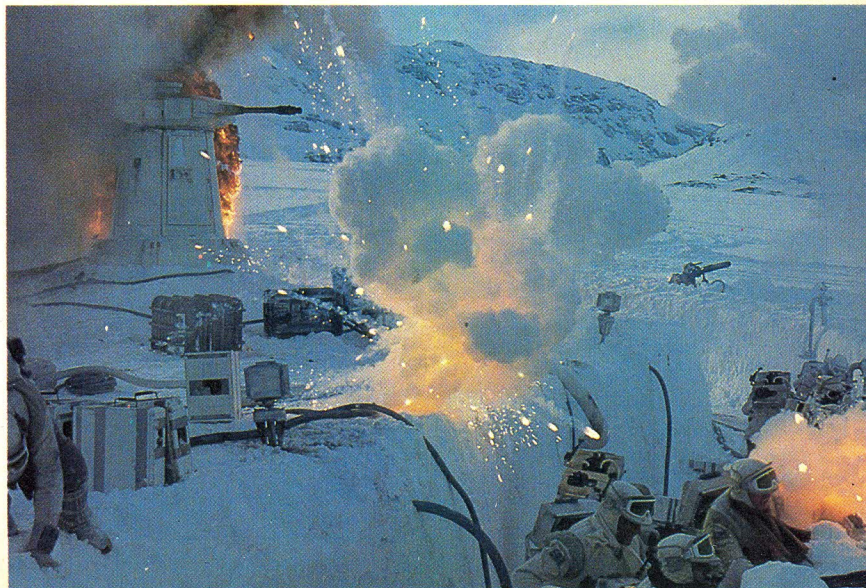


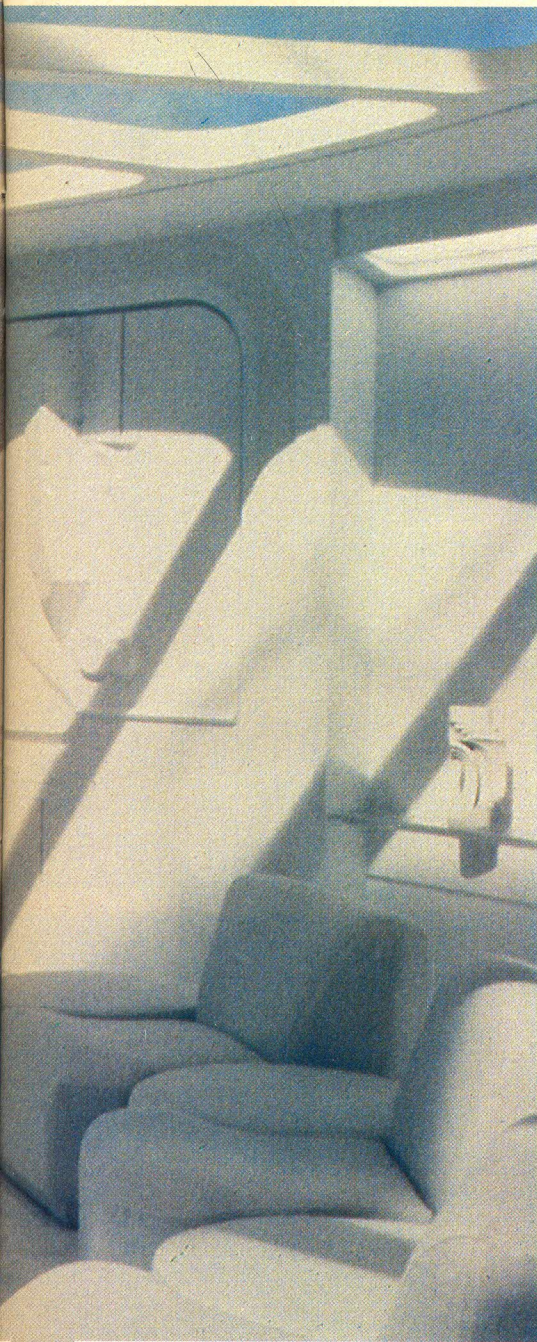
Top of page: Luke (Mark Hamill); pursued by Darth Vader, embarks on a danger-filled escape route through the exhaust system of the

Cloud City of Bespin. Above: On the ice planet Hoth, a man's best friend is his Tauntaun. Offscreen, it proved to be a well-heated hotel.



Above: Princess Leia (Carrie Fisher) enters one of Cloud City's more ornate chambers. The floating metropolis of Bespin, ruled by Lando Calrissian, is the locale where heroic Han Solo must face both the forces of the Empire led by Vader and the mercantillist skullduggery concocted by bounty hunter Boba Fett. Far right: Luke Skywalker (Mark Hamill) offers a light sabre to Vader. Vader, in turn, bemoans the lack of father's day cards in his life. Right: On the ice planet Hoth, the Rebel forces are unexpectedly driven from their underground bunkers by Darth Vader's crackerjack land troops.





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Darth Vader (David Prowse) and Lando (Billy Dee Williams) chat with bounty hunter Boba Fett.

treatment. When we were feeling very optimistic, we'd sit around and talk about how nice it would be to do another movie if *Star Wars* was successful. At the time, however, we had no idea if there was a market for it. It was just speculation.

"After *Star Wars* was released and it was obvious that there was an audience, we then talked very seriously about the idea of going on with the next logical portion of the outline which turned out to be the *Empire* story. It was within three months of *Star Wars*' release that we began thinking about getting into production."

At that point, Lucas and Kurtz contacted some of the *Star Wars* stalwarts, including Ralph McQuarrie and other artists, and handed them the Lucas outline in order to get some artistic renderings accomplished. Veteran science fiction writer Leigh Brackett was given the task of handling scripting chores. The latter choice was deemed perfect in both science fiction and film circles because Brackett was well versed in both areas; having

written such SF works as *The Book of Skaiith* and *The Sword of Rhiannon* and such screenplays as *The Big Sleep* and *The Long Goodbye*.

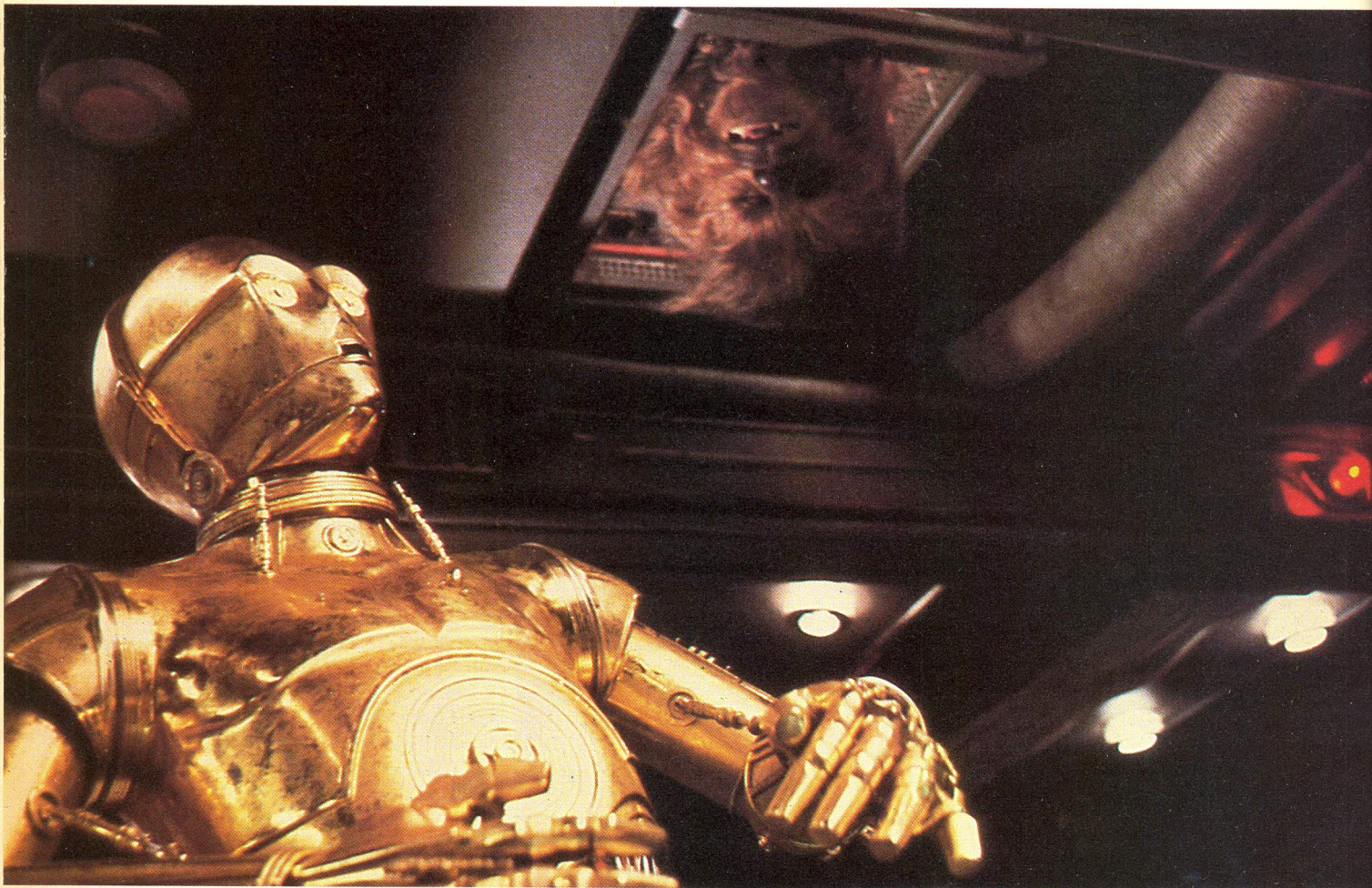
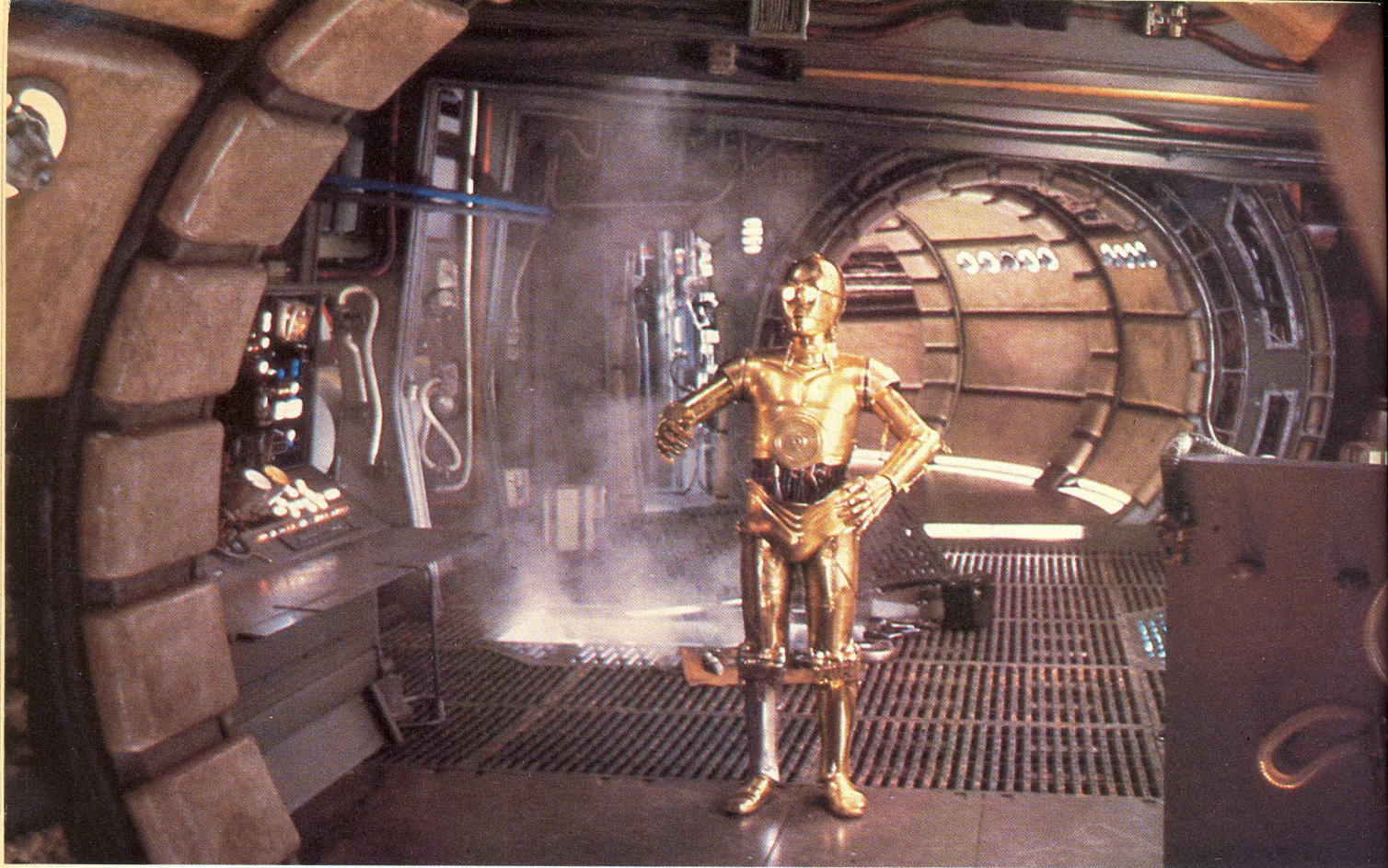
With all systems seemingly "go," *Empire* began its slow trek to the screen. Its smooth momentum did not remain that way for long, however, as screenwriter Lawrence Kasdan readily concedes. Kasdan, a Hollywood novice whose talent attracted the attention of filmmaker Steven Spielberg, was asked to pen the script to a joint Spielberg/Lucas project *Raiders of the Lost Ark*. On the day he delivered the finished work to George Lucas, he found himself being hastily ushered into the world of *Star Wars*.

"He took me out to lunch," Kasdan recounts. "This was in June or July of 1978. He told me that Leigh Brackett had written a first draft for the second *Star Wars* film and when he called her up to talk about it, he found out that she was in the hospital. Before he could talk to her, she died. Now he was up against it. He had to start building sets for a March shooting. 'Would you like to write the movie?' he asked me.

"I said, 'George, don't you think you should read the *Raiders* script first? How do you know you want me?' He said, 'Well, I just get a feeling about people.' Which I've since seen to be true time and time again. He just trusts his instincts. He just laughed and said, 'If I hate *Raiders*, I'll call the whole thing off.' He was kidding... I think. Anyhow, he liked *Raiders* and I agreed to start work on *The Empire* after I took a short vacation."

Before the writing could begin, Lucas and Kurtz had to find a director suited to helm the second Skywalker adventure. Lucas, who directed the first film, had decided early on to sit this one out, opting instead for the position of Executive Producer. ("It's really just a way of making a living," he comments. "I figure the sequels will give me enough income over a period of time so that I can retire from professional filmmaking and go into making my own kind of movies. Abstract, weird, stuff.")





Top of page: C-3PO (Anthony Daniels) wanders through the belly of the beleaguered *Millennium Falcon*. Above: Chewbacca (Peter

Mayhew) consults with Threepio. In this outing, the *Millennium Falcon* is literally looked upon as the ultimate escape vehicle.

After an extensive search, Irvin Kershner was found. The director of such films as *The Hoodlum Priest*, *The Luck of Ginger Coffey*, *A Fine Madness*, *The Flim Flam Man* and *Return of A Man Called Horse* was well aware of the impact of *Star Wars* but, admittedly, was slow in realizing its importance. Taking his ten year old to see the movie when it was first released, he spent more time observing his son than he did the screen. "At first his mouth dropped open in amazement," recounts Kershner, "and he looked bewildered. Then he began laughing and was on the edge of his seat the whole time. I wondered why he was so excited. Gradually, I then got caught up."

Kershner was so intrigued that he went to see the film a second time. "I realized, yes, this is science fiction, but it's really a fairy tale and it has the most imaginative elements I've seen in a long time. It had mythic dimensions. It was a direct tie-in to the audience's unconscious in terms of fear, love, in terms of the desire to fly, to move forward in time, the desire to be free of gravity—all those things that science fiction has and more."

Laying the Foundation

With Kershner part of the creative crew, Lucas and company began hammering out the final script. "The writing went fairly quickly," says Kasdan. "We started out with Leigh Brackett's draft. George had offered a lot of input into it but it was still very, very rough. George and Kersh and I sat down together and talked about every line in it. We talked about what this script was really supposed to be and what was missing. A lot of the dialogue was wrong. It was put there to convey the idea of the action to us. It wasn't meant to be a finished script.

"We agreed that we would meet about every two weeks and, in that time, I was expected to do about a fifth of the script each hiatus. So, when we came back from our first meeting, I had written about 25 pages. I gave them that. They sat in the room and read those pages and then they came back to the table and we all tore into them. They told me what they were happy about and what they were unhappy about. Actually, the way George works is that he never tells you what he likes . . . just what he doesn't. If you're sensitive about your ego, this can be tough. With George's technique, he'll come to a whole new scene or a whole new stretch of dialogue I've written and just flip through it. I'll be dying with each movement of his eyeballs, eager for praise. No way. His silence was my only reward."

The early *Empire* writing was a difficult albeit exhilarating experience for Kasdan. "I wasn't really a science fiction buff before getting this assignment," he says. "I'd say that factor helped. Everything was fresh to me. In addition, my limited exposure to science fiction consisted, mainly, of seeing *Star Wars*. That was my main reference. Now, I can see that, from a professional science fiction writer's point of view, my genre naivete could be a real sore point. 'Why is he writing this?' But my scripts are people scripts. They tend to be very small. I think that approach worked on *Empire* because, take away all the science fic-



The massive ice planet of Hoth set was covered with salt and sprayed with gallons of fog/oil.

ton paraphernalia and you have a character in conflict story; a tale using all the characters who made the first film so wonderful.

"The first script meetings were fantastic. They were designed to get me into the whole *Star Wars* mode. There's a certain kind of talk. There are certain conventions to be adhered to. There are some things you just don't talk about: certain units of measurement and any and all references to the planet Earth. You have to cleanse all that from your mind. In addition, the first fifth of *Empire* is all this very complicated emotional stuff. It was a real baptism of fire jumping into this. Here I had to write all these difficult emotional scenes while still trying to find the tone that was best. After that was done, it got much easier. We'd meet every two weeks. Soon we were meeting every seven days as George and Irv got more and more anxious to get their hands on a finished script."

The storyline fashioned by Kasdan is roughly divided into three areas: The first third of the action concerns the efforts of the Rebels to dig into their new outpost on the ice planet of Hoth. The second plot twist concerns Luke Skywalker's (Mark Hamill) search for the Jedi Master, Yoda (Frank Oz, of Muppet fame), and a better understanding of the Force. The final portion of the story takes the space heroes to Cloud City wherein new character Lando Calrissian (Billy Dee Williams) must choose between aiding his old friend Han Solo (Harrison Ford) or knuckling under to the demands of the Empire.

Empire's complex storyline caused more than a few problems in terms of coherent plotting but Kasdan found, as he went along, that inspiration came hot and heavy from the Lucas crew. "All along," he says, "Ralph McQuarrie was doing these fantastic paintings from George's outline. I wouldn't say that the script had any great influence on McQuarrie but he sure had a big influence on me. I would say that one of the key factors that stoked us all during the creation of the script was McQuarrie's paintings. They were a constant source of inspiration.

"At the point we were writing, we didn't have sets or special effects to work from. It was sheer dreaming. In a contemporary film, you can go out and look at a location or see a house and get an idea about how a building is constructed. With *Empire*, we ran the risk of writing words and not really knowing what they meant *physically*. McQuarrie's painting would inevitably show up at that point and give us something to hang on to. 'Oh yeah. Now I see.' Many times, they gave us ideas about where to take the action as well."

A final screenplay was finally finished and approved, much to everyone's relief. "A good description of the plot," says Kasdan, "is to say that it's the second act of a three act drama. If you know anything about classical dramatic structure, you know that, in the second act, things are usually looking pretty tense. That tells you a lot about the finished movie.

"What I think is exciting about the *Empire* is that it's not a traditional sequel in the Hollywood sense. In today's movie industry, sequel means re-hash. It's the same movie the second time around. Most filmmakers today go out of their way to get the original audiences back for a second helping of the same main course. It's boring. But *Empire* is a *real* sequel. The characters go on. They develop further. They move into whole new areas, both emotionally and physically. It's a second act in terms of plot complications, character development. Things generally look a bit grim at the end of the second act of a drama. I think that one of the things that's different about *Empire* is that you might not come out of this one whistling. The title tells you what the movie is about. The Empire is angry this time."

According to Kurtz, the finished script—indeed, the final film—is a calculated departure from the *Star Wars* style. "We didn't feel pressured to duplicate the first movie. In fact, we wanted to avoid that at all costs. If this movie was spliced together with the first, you should see one big film. If the third movie, the

(continued on page 68)

"YOUR GOD ISN'T BIG ENOUGH"

An Interview With John Lilly

By MALCOLM BRENNER

John Cunningham Lilly is that rare breed of scientist willing to talk openly about his belief in God—or, more precisely, his belief in his mind's ability to simulate God with a reasonable degree of accuracy. An M.D. with psychiatric training, Lilly is best known for his sometimes controversial research on interspecies communications with bottlenose dolphins, a study he's pursued for over 25 years (*Man and Dolphin, Mind of the Dolphin, Lilly on Dolphins, Communication Between Man and Dolphin*). A self-described "permissive" possessed of a sometimes dangerously insatiable curiosity about the workings of the human mind, Lilly has also immersed himself in sensory isolation tanks (*Programming and Metaprogramming in the Human Biocomputer, The Deep Self*), experimented with hallucinogens and Sufi mysticism (*Center of the Cyclone*), deep dyadic relationships (*The Dyadic Cyclone with Antoinette Lilly*), and explored the fringes of his own consciousness in *The Scientist*, a "novel autobiography." With Antoinette Oshman Lilly, his wife, partner and "soulmate," he has started the Human-Dolphin Foundation headquartered in Malibu, CA. He is currently conducting tests at a California oceanarium on a new computer program designed to overcome the difficulties of human-dolphin communication, *Project Janus*. Dr. Lilly was interviewed during the Second Annual Mind Miraculous Symposium of the Church of Religious Science in Seattle.

How did the sensory isolation tank work you did at the National Institute of Mental Health in the early '50s lead you to the dolphins?

I began that work at the National Institute of Mental Health, just wondering what would happen if you freed yourself up from a lot of external stimulation, and lowered all the inputs to the lowest possible level; what would happen to your mind under those conditions? It was just curiosity, just that sort of extracurricular activity one does in one's general research; they didn't even know I was doing it on my own time. I was working on monkey brains, and I'd go off to the tank and come back to the lab with a different perspective. . . . When they got wind of this, they asked me to get deeper into it. I was floating around in the tank in 1954 and started wondering about these things. I was beginning to find that my freedom of thinking was immensely increased, freed up from the necessity of temperature and gravity and light and sound and all that. There was this huge freedom of imagination, of experiencing things inside, which isn't there any other way that I know of. And I was just wondering whether there wasn't somebody floating around 24 hours a day their whole life who might be experiencing this all the time, and who would consider it absolutely normal. So I began to talk to various people about dolphins, Pete Scholander and various others, and got interested. And then the brain thing came in, looking at their brains, seeing if the substrate for mind was there. And it was.

*When you were doing that early tank work, did you have any of the type of apparent "contact" experiences with other civilizations or creatures from other planets or dolphins you wrote about in *Center of the**

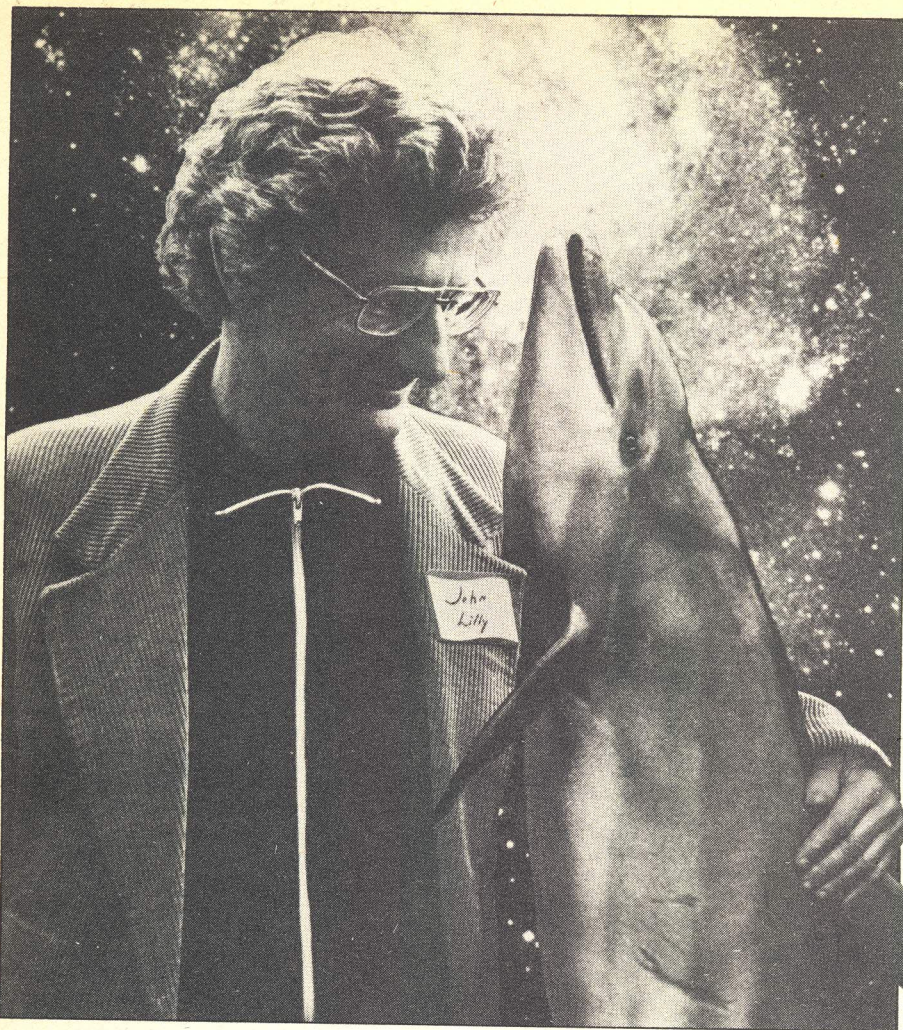
Cyclone?

No, there was a period there from '54 to '58, when I left NIMH, where the dolphin work and the tank work were overlapping. I began to see that the dimensions of mind were far greater than I'd been assuming they were, and were assumed by psychiatrists and psychologists. And I didn't own up to it at the time it was happening. I didn't own up to it until I was free to set up a tank in the Virgin Islands without all this government support and financing. In fact, none of the tank work was ever directly supported by government grants; it was all done extracurricularly. And I didn't realize how important it was until I began to see how my thinking was changing as a consequence of these experiences, and the kind of *vastness* of the whole business. The mysteries of the mind . . . I was really immersed in them. And I began to see that the dolphin mind was probably far greater than our consensus reality allowed our minds to be. That's why I want to communicate.

*In the early '60s, you got a lot of publicity from media like *Life* and *Newsweek*, and there was a big surge of interest in the possibility of interspecies communications with dolphins. Did that make your work more difficult? Did it make other scientists more skeptical of you because you'd "gone public" before your results were confirmed?*

That was unplanned; the results began to come out in sources like *The Journal of Acoustical Research & Engineering*, and the media got interested. They were reporting on what we were doing; we weren't seeking them. Now, as to what you mean by "other scientists," I don't know.

Other marine mammalogists.



Well, I'm *not* a marine mammalogist. Never have been. I've never been a cetologist or a delphinologist in the narrow sense that those people call themselves. I've never approached dolphins that way; I've always approached them from the standpoint of mind. They won't even assume dolphins *have* a mind, so right off the bat we're in entirely different domains of discourse. I've never felt that conflict they've felt; it's their conflict, not mine.

Between the period in 1968 when you released your dolphins and the beginning of Project Janus, did you get discouraged about your dolphin research?

Well, the time wasn't right. The computers weren't fast enough, small enough, and didn't have large enough memories to do the job I wanted them to do.

Between Aristotle in 350 B.C. and the resurgence of dolphin interest in the '50s, due largely to your work, we have a terrible gap in our curiosity about these creatures. Why? How did we lose that closeness with the dolphins that the Greeks and some other ancient peoples had?

The Mediterranean was much warmer in the time of the ancient Greeks, and they were much closer to the sea. And Aristotle was, I think, a kind of observing genius who got in contact with fishermen and people who were in close contact with the dolphins. And they

must have had dolphins in captivity, caught in shallow pools or something like that, and they just were free with them, spoke to the dolphins, and the dolphins spoke back. It was this intimate contact, which we reproduced in experiments back in the '50s and '60s, which led to Project Janus. In the modern oceanaria there isn't much of this. It's beginning, but it's not there yet. It's shallow-water intimacy with the dolphins. Humans in deep water are pretty ineffective; dolphins in extremely shallow water are pretty ineffective, but you have to balance those two things together, and I think that just by chance the Greeks did that. If you follow the history of humans since then, they got away from that, away from the sea. They stuck to deep water when they went to sea, and this tidepool thing just disappeared. The whole attitude—the belief systems and so on—were counter to it. The Jewish-Christian-Moslem ethic took over, and we totally moved away from that free-floating thing the Greeks had. The interest in dolphins as reincarnated humans and all that disappeared.

One point Robin Brown makes in his book Lure of the Dolphin is that, in terms of their morals and their scruples, the Greeks actually placed the dolphins above their own gods! One can detect a lot of the same thing in your writings—that there is a morality in the dolphins that prevents them from harming humans, under most circumstances.

Ethics. It's taught. The Greeks worshipped dolphins; they had a dolphin cult. Temples to them were found in the Negeb desert, for instance. It was a very, very different socialized belief system which disappeared. And the modern point of view, which we started going after, was just sort of empirical approaches to them based on all sorts of considerations the Greeks didn't have, such as their large brains, their behavior in captivity—those sorts of things.

Do you think the Greeks kept dolphins in captivity for religious purposes?

Yeah, I think that the original Delphic oracle, before the gal who was breathing vapors from a vent in a volcano, was probably a sea-side thing that was never written up, in which certain people began to use dolphins speaking in air as oracles—spiracle oracles, you might say. But that's speculation.

You said earlier that you weren't expecting a "breakthrough" at this stage of Project Janus. Is it fair to ask what you are expecting?

A lot of hard work, one step after the other. For a while we're going to have to be really restrictive, because it's going to be a lot of hard work by a very few people. It'll be a while before we can get our feet on the ... get our feet *wet*. We don't talk about "getting our feet on the ground" any more.

What level of communication do you think you can achieve with the equipment you now have?

I don't know; that's open-ended. Imagine starting out with humans, say, somebody that didn't know your language, with the Janus program. Now, in the Janus software there is a program which chooses alternate tables of frequencies; one for the dolphins, based on their frequency discrimination curve, and one for humans, based on ours, and we've been working with humans on this. Turns out that there are new gestalts that develop. For instance, if you type H-E-L-L-O and activate Janus, it comes back with the frequency for H, and the frequency for E, the frequency for L, and repeats it, and the frequency for O. This makes a little tune. And that word has been used so many times around the lab that everybody knows when the computer's saying "hello"

Like the tones on a touch-tone phone?

No, it's not, because the touch-tone phone is designed so you can't do that. Each button has two tones, so a pure tone won't affect it; they're fouling you up on that. It doesn't have the clarity it would if they were pure sine waves. The basic idea is quite different, actually. What does the phone have—12 buttons?—of which we only use 10 for normal dialing. And we have 48 buttons, each one of which gives you pure sine waves, and each of which you can remember, without trying to untangle multiple frequencies. So you're hearing pure tones the way you would keying a synthesizer with only one oscillator instead of three.

But you type in "hello" and what comes

out is a characteristic tune?

A *gestalt*, right. An easily recognizable acoustic *gestalt*. It looks as though we will be doing a very peculiar job, which reminds me of Herman Hesse's Bead Game in *Magister Ludi*, in which they're combining mathematics, logic and music in a very complex game. And that's what we're doing, really—developing a whole new vocabulary in the acoustic sphere which is representable by ordinary typewriter script. John Klemmer came up and started playing with it, and he wants to write music this way. So now you can type out music on an ordinary typewriter. For instance, we worked out what that theme they used in *Close Encounters of the Third Kind* means, where they start communicating with the aliens. You have these five notes. Well, it turns out that on the Janus program those are S, U, Q, B and K.

Not much of a message . . .

Yes it is, because anybody who's seen CE3K recognizes it instantly. So you've got all these new degrees of freedom in the acoustic versus the symbolic typing. For instance, we can type out a very long message on Janus, put it through a phone line, bring it back into Janus, and Janus will type out what those sounds mean.

Why did you decide on a computer system, rather than a frequency-shifting real-time vocoder, as described in Mind of the Dolphin?

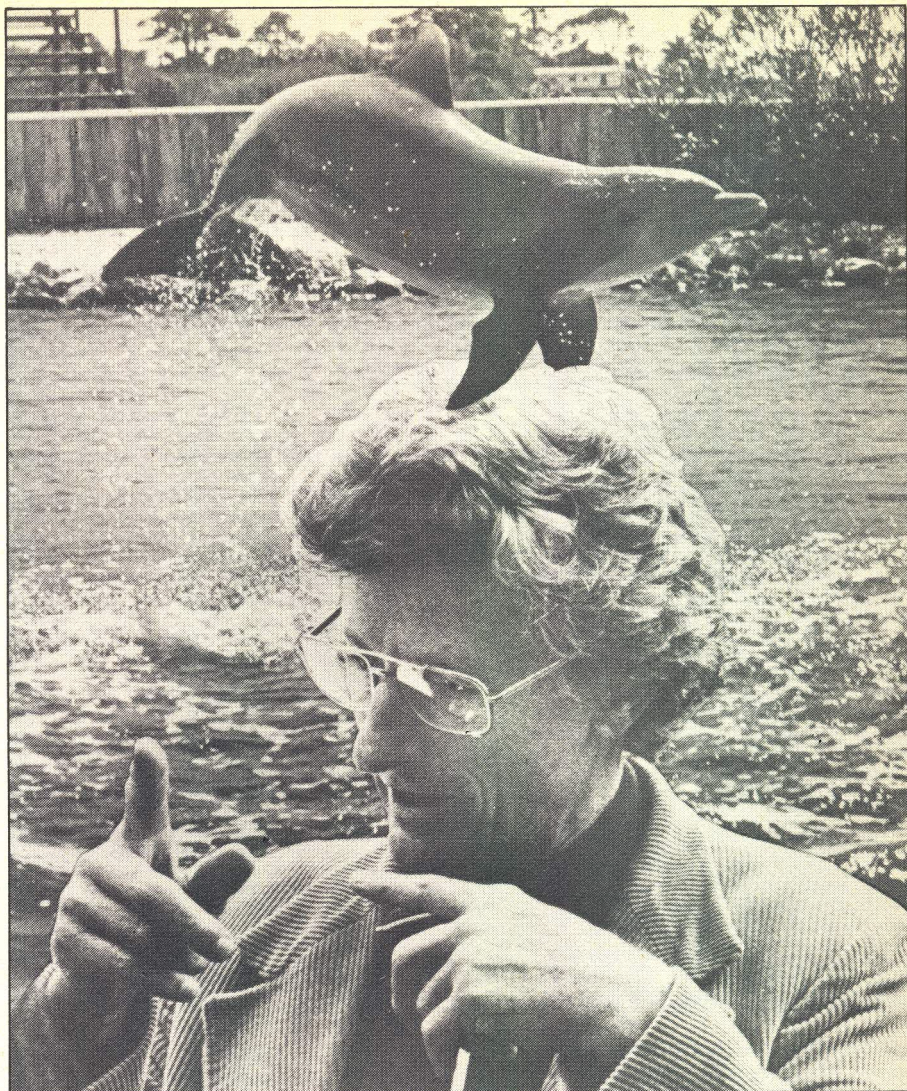
I wanted a system that is more easily, reliably reproducible than a human talking.

Punch a key on the computer and you always get the same sound out the other side?

Right. It's an elementary approach where you have a chance of learning new things about the dolphins' perceptual systems. Then you can eventually design something that's much more sophisticated, based on the basics you discover with this approach. It's what you might call a survey apparatus. You've got a general purpose computer you can reprogram; general purpose interfaces you can reprogram through the computer so the voice can be reprogrammed, the ear can be reprogrammed. So you can try different approaches. We're initially starting with pure sine waves as the output to the dolphins, from about 3,000 to 40,000 Hz., and varying the duration. We've had to modify our initial guesses to match their frequency-discrimination curve a little better. We may then add clicks, continuous FM whistles and tones. This is just the initiation, the opening-up of the whole field. Janus is the first system that has total round-trip feedback, where the computer has a voice and ears, instead of dictating to the dolphins, as some other researchers are doing. They ignore what the dolphins have to say, mainly because they don't have the sophisticated approaches that allow the computer to hear and interpret the sounds.

Will the computer have a memory system that will allow it to build up a vocabulary of dolphin sounds?

Not initially, though we will be building



John Lilly has dolphins on his mind. Project Janus is an attempt at interspecies talk.

that up through the transitional symbolic vocabulary. We're starting with 48 symbols, which is a sufficiently large population so we can get a large number of different strings. English has 44 phonemes in it. That should appeal to the dolphins; they like long strings and context strings, a great variety of sound. And we're covering their frequency-discrimination curve where they're best at it, the way English covers the human curve.

So the objective of Janus is to set up an intermediary language between humans and dolphins?

Yeah. Now language . . . we've set up a code system to develop any number of languages, and we've tried to arrive at a reproducible standardized system, which you can't do with a vocoder, because of the variations in individual voices . . . yet vocoders have degrees of freedom this doesn't have. The vocoder will respond to different kinds of voices, and the dolphins will answer in different voices. But here, we're requiring a rather narrow slot in performance on their part, which we can record and follow. So at one end of the spectrum you have this rather rigid system we've devised, and at the other you have a somewhat more flexible system. We'll probably meet in the middle

somewhere, so there's more flexibility and it's more like a voice.

Now, if I were a dolphin inputting into Janus, would I have to input in the same pure sine wave tones Janus puts out to me?

Well, we had a gal who put a pair of headphones on—we used the human scale on this—and she had a Moog synthesizer, the keys on it marked like a typewriter, so you can tell just what you're typing out. She was typing things in, listening to the tune, then singing it back into Janus through a microphone. And she could make the transfer; she would type out words on the synthesizer, hear them, then with her own voice sing to Janus, and Janus would type out the same thing. But she's an expert singer.

So you don't anticipate nearly as much trouble on the dolphins' part as it would be to phonate in air, as you were doing earlier?

Oh, no, this is all underwater. Though they have started to phonate in air, mimicking Janus's output. Apparently they're eager to learn.

Have you received widespread public support for Project Janus?

Enough. We've always had just enough

money to keep going, never too much. I'm glad we didn't have too much. I found out long ago that if there's too much money available for something, all sorts of people move in on it and waste time. If you have just enough to go, you eliminate all the people that aren't really dedicated to it, because they feel they can't afford to stay in it, and they can't. So the people left in the Janus Project are the people who feel they can afford to sacrifice large salaries and affluent living just to be able to do this program.

One question raised by Ian Watson's novel The Jonah Kit is whether there might not be dangers in interspecies communication, specifically dangers for the dolphins, in contact with the alien human mind. Look at the history of slavery, or the American Indians, for instance; take away their food source and their land, their power base, and you render them ineffectual. Might we not "ghettoize" the dolphins, the way we have other human races?

Well, there's quite a difference, isn't there? There's a limited territory on the land; the land is only 29 percent of the total surface of the planet, and of that only 10 percent is inhabited by humans. So humans take up only 2.9 percent of the planet, and of that 2.9 percent there are very stringent requirements for survival of people. You have to have agriculture and manufacturing and so on for human survival. When you contrast that with the 71 percent of the planet that is inhabited by cetaceans, you have a freedom of territory—or a lack of territory, more like it—freedom of travel—that none of the terrestrial mammals have ever had. It's an entirely different universe, so there's no way to compare it with restrictive human depredations on humans and territorial aspects. The whole territorial concept kind of disappears.

Yes, but obviously our pollution of the sea must represent a threat to their existence. The whole problem with the dolphin kills at Iki, Japan, comes from the fact that the northern waters got polluted, forcing those populations south. Could the day come when the sea will no longer support dolphins, and they'll be dependent on humans for their existence?

I don't know. I don't have the global view yet. I think we're overrating our abilities to pollute the oceans. Once we thought the oceans were an infinite sink for all our wastes. Local effects, yes. Off large cities with huge manufacturing and all that, you can poison the fish with mercury, but it's still a very shore-based view of the oceans; an ocean is a big place. You just fly across the Pacific from here to New Zealand and look at all that water! I think it's rather egomaniacal to think we can influence that very much, especially if we can get our awareness up to the dangers of certain kinds of chemicals, and reduce that. I go along with one of the biologists, John D. Isaacs, who was writing about so-called "pollution." What are our concepts of pollution? One of them is sewage. I'm not talking about industrial waste, now; I'm talking about human shit. What is it? Mainly a culture of *Escherichia coli*, the colon bacillus, and according to the biological view the colon bacillus is

a universal symbiote inhabiting the colons of all mammals. Now, whales and dolphins all shit in the sea; the colon bacillus seems to be one of the basic substratum for the perpetuation of life. So you can look at it not as a contaminant, but as a substrate for the building up of bacteria, of protozoans, plankton, krill and hence, finally, of multicellular life such as mammals. So if you look at a much more thoroughly biological viewpoint about the turnover of life on the planet, the colon bacillus is somewhere near the bottom of it, and is essential.

To people who like clean bathrooms, and don't like shit around, and object to other people throwing it around, this may sound like a radical point of view, but it isn't; it's basically scientifically correct as far as I can make out. So when we confuse pollution with the whole basis of life, that shows how far



John and Antoinette Lilly: co-researchers.

away from nature we really are, and how far away from nature most of our knowledge is. The shore areas are where we know most because that's where man is. I can't speak for most of the sea. If you can get floating cities, and really look at the ecology, and get people who live at sea, not in the usual vessels we use to cross oceans, but the kind where you can live in intimate contact with the sea-creatures, I think we'll know a lot more. Farming the sea would be a much better way to approach it; encouraging the organisms that are essential to other organisms. The oxygen on the planet depends on it. Somebody was saying the other day that three-quarters of the oxygen in the atmosphere is produced by photosynthetic organisms of the sea, as opposed to those on land, so the essential support of the atmosphere depends on the sea, for the absorption of carbon dioxide and the creation of oxygen which is necessary for all forms of aerobic life. Of course, the anaerobes could take over, as they do in a stagnant lake . . .

You have observed that the dolphins seem to be as interested in communicating with us as we are with them. Do you think that, in the future, they will be interested in cooperating to help us run the planet?

Well, that's a question I've stopped asking. There are lots of questions I've stopped asking with the prospect of being able to ask them of the proper people—the dolphins and whales. At the time you open a new doorway, as we are hoping to do, you stop asking questions about what you're going to find on the other side because you're waiting to find it.

I don't know that we're bright enough to do this, to work out means of communicating

with the dolphins; then after we work out the means, are we bright enough to understand an alien mind? I don't know, but we'll give it a good try. And hope that we get some really bright people who will exert their best efforts in this area. Not just our group. I think orcas are going to be very interesting. . . .

There are reports of unusual psychic experiences with dolphins. Are you investigating these avenues of communication?

Not at present; they're not reliable enough. Nobody has yet worked out a way of giving good, solid demonstrations of network of mind, except through physical means of communication. This depends on your basic belief systems about mind. Is mind a universal network all over the planet, of which we're only vaguely aware, or is mind going from one isolated mind contained in a brain to another one? I have no way of making a choice. As I keep explaining to audiences that keep asking about ESP and mental telepathy, in the people I've come in contact with it's either a "wild talent" without much discipline or it's a mediumistic sort of thing. Whereas communication by sound is universal in both our species, and if we can work out the proper means, anyone can use the method.

Has the work of science fiction writers influenced you in any way?

When I was doing the early tank work, I began to look for people who had the freedom and imagination I was finding. And people like Olaf Stapledon and Frank Herbert were obviously getting into the same realms of thinking and experience that I was already in. So I used them as examples. Herbert's now on the Board of Advisors of the Human-Dolphin Foundation. I also asked the staff of Project Janus to go see the movie *Alien*, because it presented such an alien alien. Something utterly unhuman. Nothing like a dolphin, of course.

Then you find yourself on common ground with certain science fiction authors?

I don't know what "common ground" means; we've been talking about infinities! Openness to new domains is more like it. In *The Star Maker* I felt that Stapledon had finally gotten a god that was big enough. Like the old story about the minister and the astronomer. The astronomer is showing the minister the Andromeda Galaxy, and the minister looks up from the telescope and says, "Now doesn't that prove the existence of God?"

And the astronomer says, "That's not the problem. The problem is, your god isn't big enough!" Stapledon's god was big enough.

What is your dream or hope for the future of interspecies communication?

To get it going . . .



Donations to support the work of the Human-Dolphin Foundation are tax deductible and may be sent to: The Human-Dolphin Foundation, P.O. Box 4172, Malibu, CA 90265.

SPACE SHUTTLE

THE PROBLEMS

Building the world's first real spaceship is no easy task—even for NASA's wizards!

By JAMES E. OBERG

What's the problem with the space shuttle? That question is becoming more and more common as delays and difficulties mount. With the first space launching now more than a year behind schedule, space enthusiasts are wondering what became of the NASA wizards who gave us the Moon only a decade ago.

The problem is that the space shuttle *Columbia* doesn't look very complex or difficult. Winged spaceships have been around as science fiction concepts for half a century. The 747 drop tests at Edwards Air Force Base took place almost three years ago. It all worked so well in *Moonraker* (more than seven space shuttles blasted off simultaneously!). Now we read stories about how the Russians and the French are building space shuttles of their own.

Such images hide the reality that the construction of a reusable winged orbital spaceship is a very challenging task—comparable in difficulty to the entire Moon landing program. The NASA space shuttle is a synergistic combination of new aerospace technologies which were not even possible in the age of Apollo; it also incorporates a number of design compromises required to carry out a wide variety of missions. Other countries may be setting their sights on small, special-purpose 15,000 pound two-man "lifting body" vehicles with minimal cargo capacity, but they do not compare in capability or complexity with the 180,000-pound space shuttle orbiter, its 65,000-pound payload and its hundred mission lifetime.

The space shuttle will use radically new methods for getting back from orbit. These

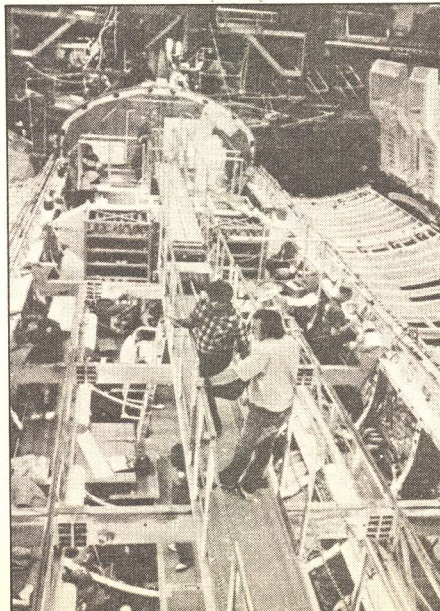
revolutionary techniques have distinct (and compelling) advantages, but they have definitely introduced new problems as well. And unlike earlier generations of spacecraft during which design advances could be introduced one by one on a series of flights each more difficult than the preceding, *all* the space shuttle engineering breakthroughs must be orchestrated to perform on the very first mission.

As most spaceflight enthusiasts already know, the rocket power for the shuttle's blast-off is provided by the three space shuttle main engines (SSMEs) and by two solid rocket boosters (SRBs), with the SSMEs fueled from the giant external tank (the ET, the world's largest throwaway cold drink can) since the winged orbiter vehicle carries no

propellant of its own for the initial launch phase. While the total liftoff thrust is about the same as that of the Saturn Vs used to send men to the Moon, the engine efficiency is even greater.

An SSME has a "specific impulse" (a measure of engine performance equal to the duration for which one pound of fuel will produce one pound of thrust) of 450 seconds, 50 percent higher than that of the Saturn V liftoff engines. It operates at chamber pressures and temperatures significantly higher than any earlier design. And it is built to operate a hundred times over a period of several years instead of just once. Now it might be a little clearer why such a space machine is bound to be tough to perfect.

And let's not forget the solid fuel engines,

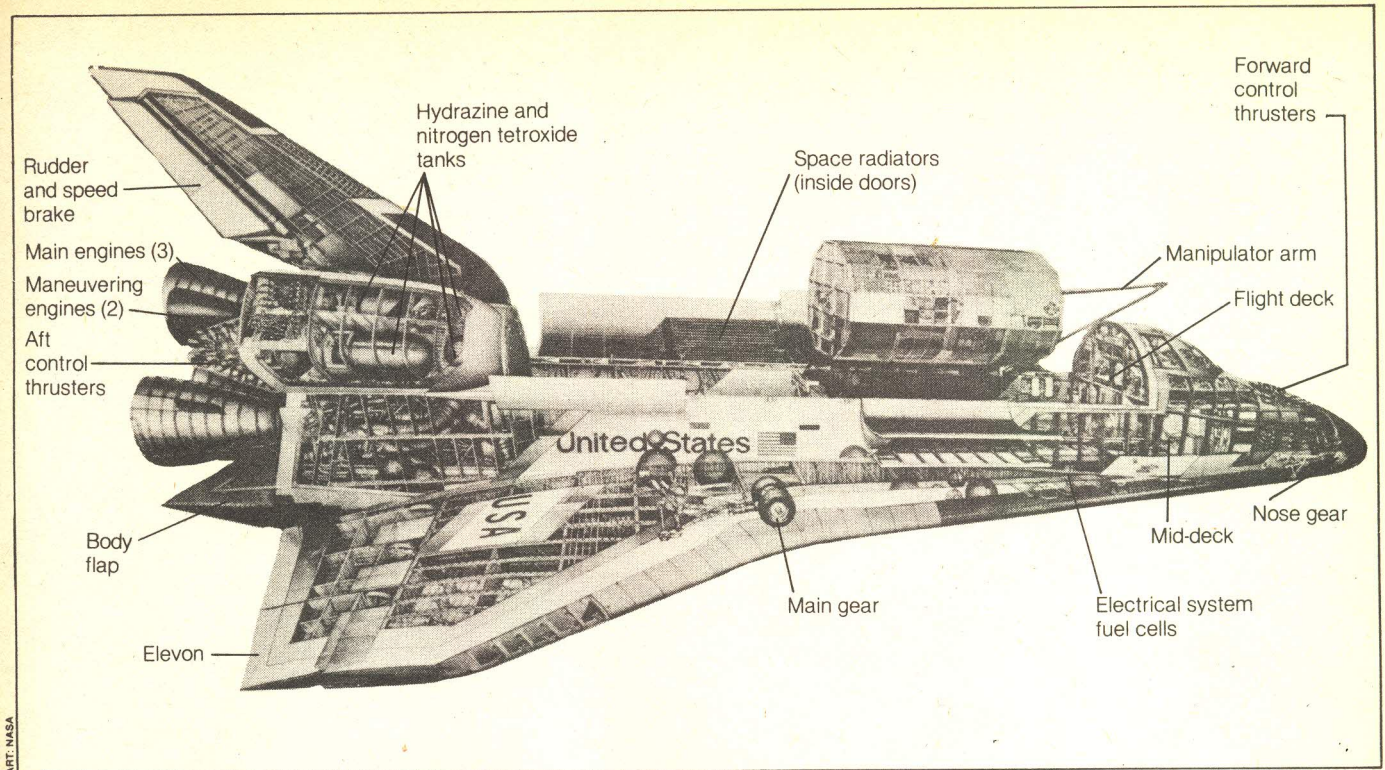


Support structure inside cargo bay.



Tile replacement and repair continues.

Adapted from Star & Sky by permission of the author. © 1980 James E. Oberg



ART: NASA

the most powerful ever built and the first to help carry a manned spaceship into orbit. Beyond the engineering of the individual units, their parallel staging presents additional complications (relative to the normal vertical staging) for attaching the units during their thrusting and for safely detaching them after they are expended. The same problem applies double for the giant external tank.

Returning to Earth from orbit poses different problems. In twin pods on either side of the orbiter tail structure are redundant orbital maneuvering system rockets (OMS) which are used for the final spurt into orbit, for changing orbits, for carrying out a rendezvous, and for changing course back into the atmosphere. In both pods, and independently in the orbiter's nose, are small attitude (*not* altitude) control rockets, the reaction control system (RCS). Here's one problem: During every previous manned and unmanned space mission the section of the spacecraft containing such propellant tanks was jettisoned prior to the atmospheric entry (which used to be called "re-entry" but is only done *once!*). But the orbiter's OMS and RCS tanks are built into the spaceship's recoverable structure—so propellant usage must be managed carefully in order to keep the vehicle's center of gravity balanced. Along those lines, the SSMEs must be thoroughly purged of excess propellant trapped in the lines, so as not to make the orbiter tail-heavy.

Earlier recoverable space vehicles were conical, truncated conical or spherical—but their common characteristic was their symmetry and their positive stability (that is, the entry air blast helped maintain a safe end-forward attitude). The orbiter is entirely different: It must maintain its heat-shielded belly facing into the air blast via positive control using the RCS jets and, later, the wing and tail

surfaces. Without such control the vehicle would be swerved sideways and would be torn apart within seconds. Yet so unstable is this trajectory, at speeds up to Mach 30 (30 times the speed of sound), that human reflexes alone are not fast enough. A sophisticated computer control system will assist the human pilots. The software (computer programs) for such a control system must meet unprecedented standards of speed, precision and reliability; the hardware can involve up to four levels of backup systems.

The white-hot flames of atmospheric entry are legendary, but the commonly accepted premise that they are caused by air friction happens to be a myth. If that were true, the fragile insulation tiles would be ripped away almost at once—leading to a flaming death for the astronauts. This does not happen because the heat (and more importantly, the deceleration) is not due to friction but to the super-compression of air which piles up ahead of the onrushing spaceship. The hottest air, which forms the radio-blocking ion sheath around the ship, is a few feet in *front* of the heat shield.

Think of it this way. Almost all of the kinetic energy concentrated into the spaceship by nine minutes of furious rocket fire at launch must be dissipated into the air during atmospheric entry. The protective tiles (which for the first time must be reusable and must spend the dynamic and dangerous launch phase exposed on the outside of the orbiter, subject to damage and deterioration) need to be of a remarkable material. The technology of tile alignment and attachment is also very delicate.

More new auxiliary space equipment is to be used throughout the orbital test flight of the *Columbia*. Special high-powered hydrazine-fueled hydraulic pressure units have been built to drive the wings and tail sur-

faces. More efficient fuel cells are available for electrical power. A lightweight tricycle landing gear has been built.

And don't overlook the primary mission of the operational space shuttle: transporting cargo to and from orbit in the spacious "payload bay." This cargo hold must be exposed to space by the opening of the 60-foot-long payload bay doors, via a complex mechanical system of latches and motors the likes of which have never flown in space before. The doors must also open to expose thermal radiators mounted on their inside surfaces, which dissipate excess heat generated by the electrical power being used inside the ship. Since the payload doors were designed to operate in zero gravity, the doors cannot even be opened for testing on Earth without an elaborate support structure.

Moving large cargos in and out of the payload bay will be done with a triple-jointed mechanical boom whose motorized control requires complex computer systems.

The astronauts will have much improved life-support systems: the first two-gas, oxygen-nitrogen, sea level air system on an American space ship; a new improved spacesuit and a jet-powered maneuvering unit for space walks; and a genuine sit-down air-flow toilet!

All the future possibilities for the space shuttle discussed on the following pages depend on the basic system working. And now perhaps you have a better idea about just how delicate and sophisticated a task that is. For one-sixth the cost of the Apollo Moon program, equally difficult technological challenges are being tackled. The result will be a revolution in space transportation which will ripple through our entire economy and society, as a permanent avenue to outer space becomes a reality. But be patient: The wizards are faced with another tough one! []

SPACE SHUTTLE

THE PROMISE

America's spaceship will open a plethora of exciting opportunities off-planet.

By ROBIN SNELSON

In addition to the technical trials and tribulations faced by the space shuttle (outlined on the previous pages), our national spaceship has had to weather its share of political storms. Conceived as it was during a time when Congress was tightening NASA's purse strings, the space shuttle was compromised from the start by budgetary

restrictions. Some critics argue that the very design of the first reusable spaceship was ill-advised; that NASA went too far to appease a penny-pinching Congress and President, and ended up with a bargain basement craft that will be lucky ever to escape the bounds of Earth's gravity. Others fault NASA's focus on only a fragment of what might be con-

sidered a "total" space program; i.e., what good is a shuttle service without a destination at the other end?

And while news reports chronicle the interminable delays and continual cost overruns of the beleaguered spaceship, NASA's public affairs officers grow more and more cautious about promoting the exciting promise of the space shuttle era. Who can blame them? The rosy pronouncements made in the first flush of shuttle publicity only a few years back do tend to sound a little starry-eyed in the light of items like exploding rocket engines and shedding ceramic tiles.

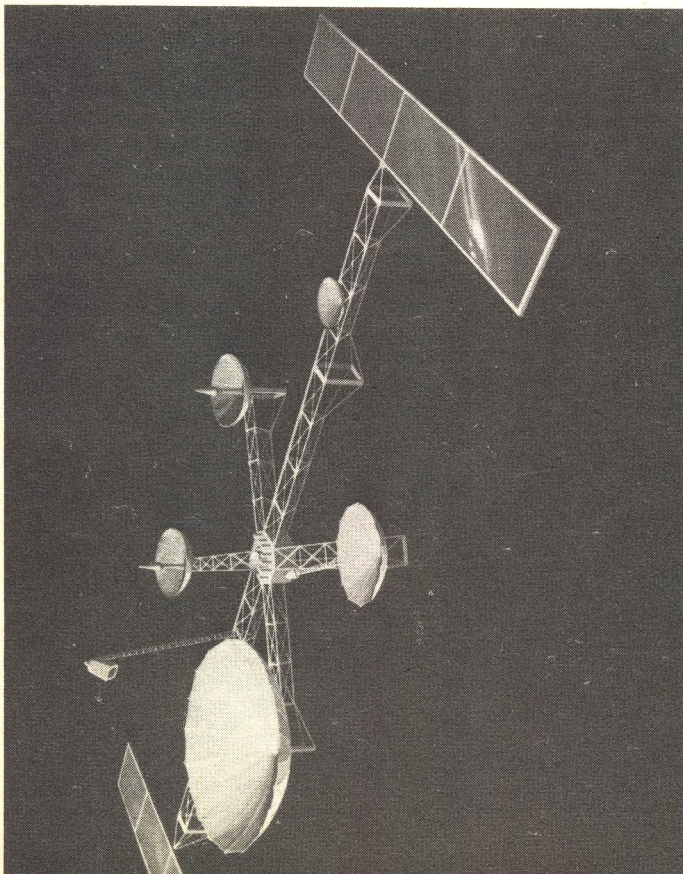
The problems plaguing the space shuttle have overshadowed the promise of the new frontier about to be opened.

So with FUTURE LIFE's usual optimistic disregard for such fine points of journalism as "newsworthiness," the time has come for a pictorial reminder of the exciting action made possible by the fleet of space shuttles NASA intends to have flying by decade's end. (That is, when one finally *does* get off the planet.)

The following laundry list is neither chronological nor in order of priority. The possibilities listed are just that: possibilities. Most of the activities are certainly not in NASA's budget, and many probably will not be carried out by NASA when and if they come to pass. But they are all open for consideration in the space shuttle era.

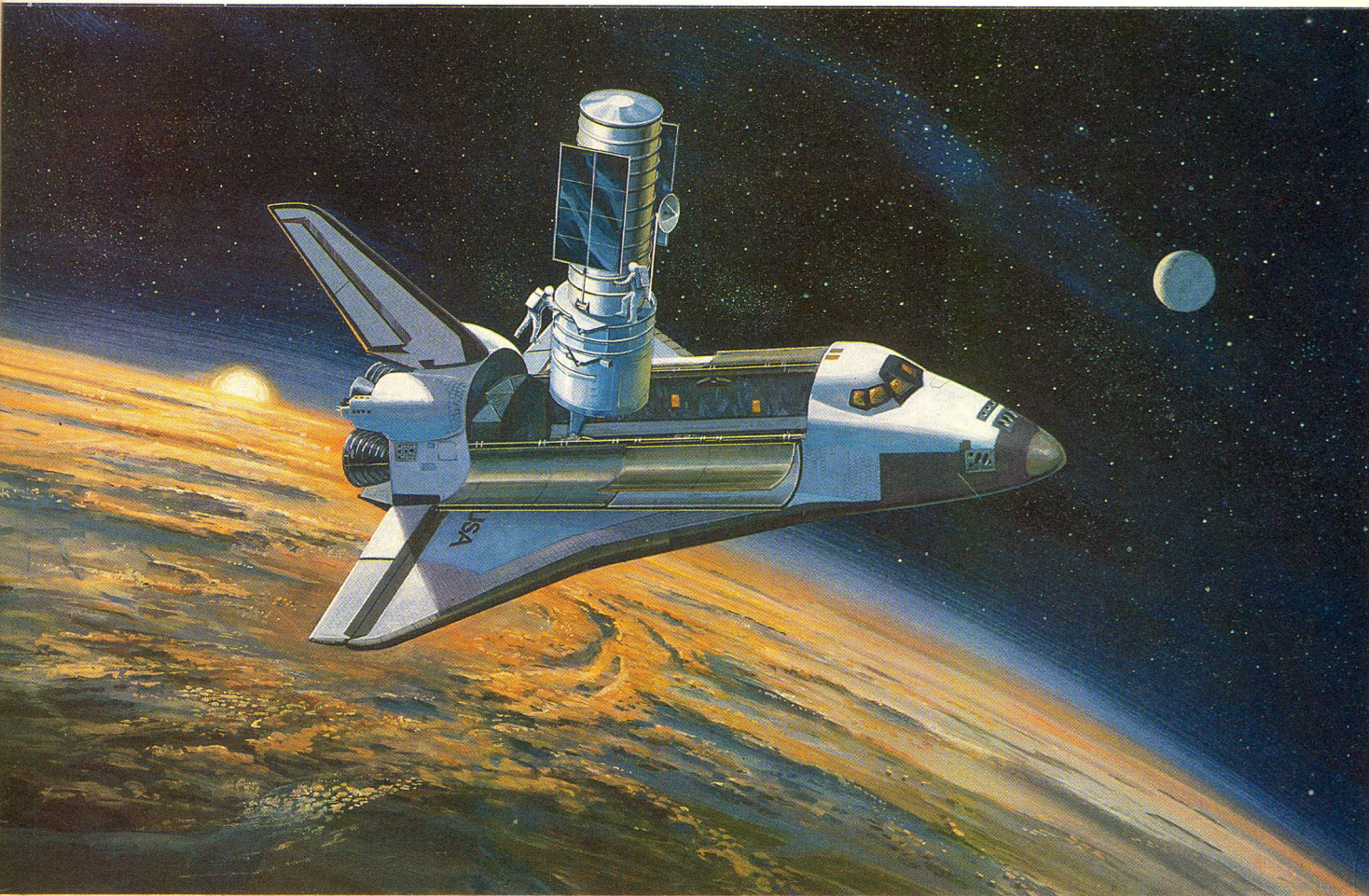
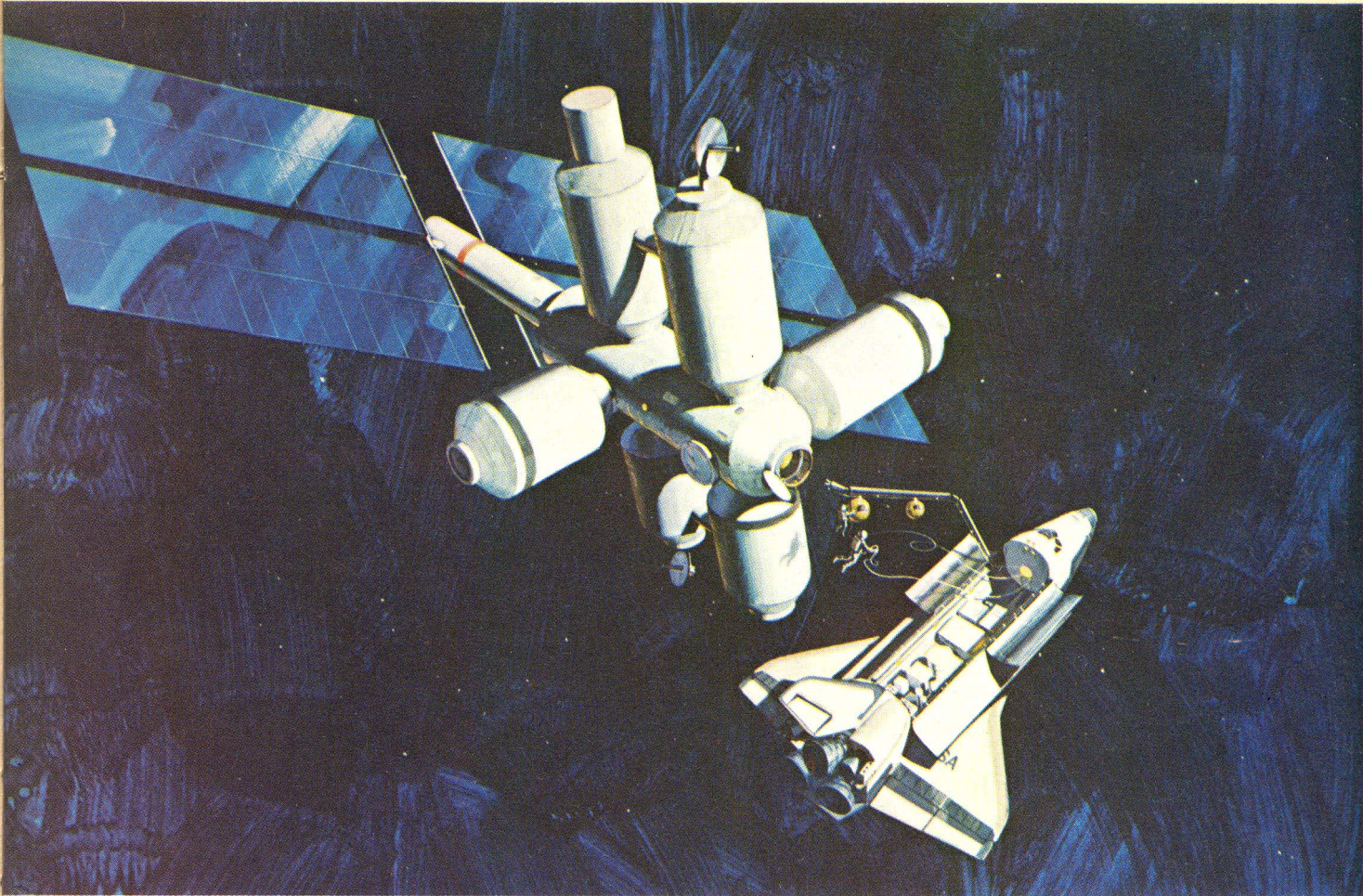
Seasoned observers may find a lot of "old news" here. Or maybe it's just that the ideas are a little less premature than when they were first aired.

In the space shuttle era, we will be able to:
1. See to the edge of the universe (almost).
The space telescope—43 feet long, 14 feet



Left: An early shuttle project will be to test a multi-purpose communications platform. Such a platform will validate new technology for communications satellites as well as test the techniques for space construction.

Opposite page, top: An early space station, built by combining modules carried to orbit by space shuttle and powered by a solar electric array, is a potential project for the 1980s. Bottom: In the mid-'80s, shuttle will deliver the space telescope to orbit and our universe will become suddenly much larger.



wide with a 96-inch mirror—should be delivered to orbit by the shuttle in the mid-'80s. Because it won't have to peer through Earth's murky atmosphere, the universe will suddenly become much clearer—and much bigger. Astronomers will be able to see even further into the past, observing objects so far away that their light has taken billions of years to reach us, and watching events that happened shortly after the formation of the universe.

2. Experiment with zero-gravity and vacuum. The space shuttle will ferry the European-made Spacelab into orbit, where scientists and payload specialists will be able to perform laboratory experiments to see how animals, plants and minerals function in zero-g. Experiments on Spacelab should answer a few questions and raise a lot more.

3. Spend time in space. With the addition of a 25-kilowatt power extension package (PEP),

the shuttle can remain in space for more than two months. The PEP, a solar electric power station, will be left in orbit to service subsequent shuttle visits, or perhaps power a free-flying spacelab. Although it is considered a basic shuttle accessory, PEP is not presently funded for development by NASA.

4. Discover new materials. Given a suitably equipped laboratory and a little time in orbit, scientists believe they can conjure up entirely new metal alloys with valuable properties. Metals that will not mix in the presence of gravity because of density differences may come together with relative ease in a weightless environment.

5. Observe the effects of prolonged exposure to space. The LDEF (long duration exposure facility) is a giant experiment rack, a 30 foot tall aluminum canister shaped like a polygon and divided into shallow trays. After resea-

chers fill the racks with instruments, materials, electronic parts and paint samples, the shuttle will deposit LDEF in space for a year or so. A later flight will recapture LDEF so that the researchers can see what space has done to their samples.

6. Capture satellites in orbit. With the robot manipulator arm, smart computer programs and some good flying, shuttle crews will be able to snatch satellites out of orbit and stow them in the shuttle's capacious cargo bay. Very expensive satellites that malfunction in space can then be retrieved and repaired on Earth. Today they are kissed goodbye.

7. Kidnap Soviet satellites from orbit. For whatever reason. It's safe to say Defense Department thinkers have not overlooked this capability of the space shuttle.

8. Repair satellites in orbit. For some electronic glitches, a minor in-person twiddle could set an errant satellite right again. Ten million saved is ten million earned. The cost of all satellite services is bound to fall as a result.

9. Explore the planets. With the space shuttle's comparatively smooth launch and the option of being able to make last minute adjustments to finicky electronics, planetary spacecraft can become more sophisticated and less expensive at the same time. Maybe NASA will be able to afford more of them.

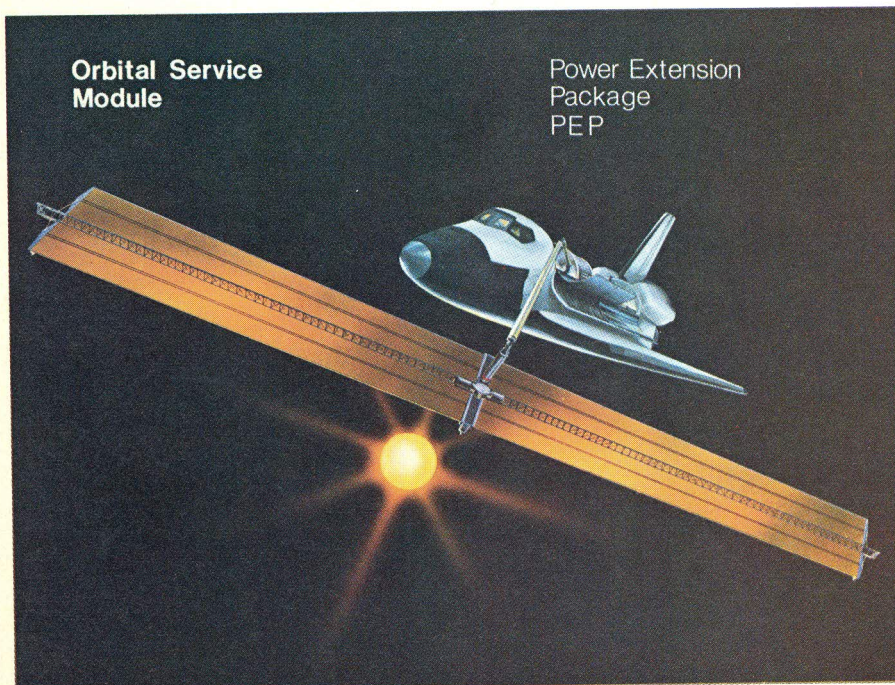
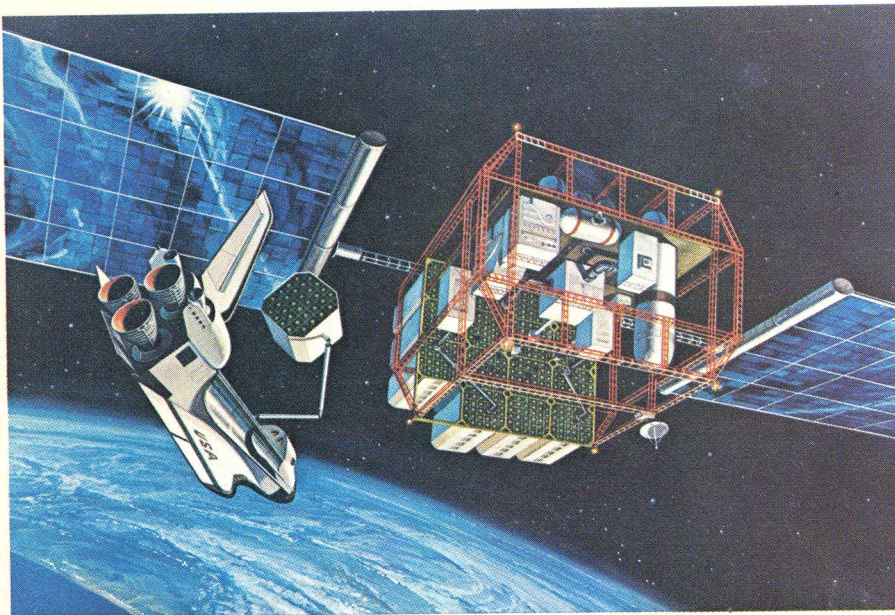
10. Discover new planets. If there are any respectably sized bodies orbiting nearby stars, the space telescope will be able to see them.

11. Look after Earth. Shuttles will usher in a new generation of more sophisticated Earth resources satellites which monitor the environment, forecast crop yields, and search out mineral and petroleum deposits. In addition, people onboard the shuttle will be able to eyeball the planet from their vantage point several hundred miles up. While even with assistance the human eye isn't equipped to process as much information as Landsat's array of sensors, its direct connection to a human brain can sometimes more than compensate by allowing leaps of imagination impossible for even the smartest satellite.

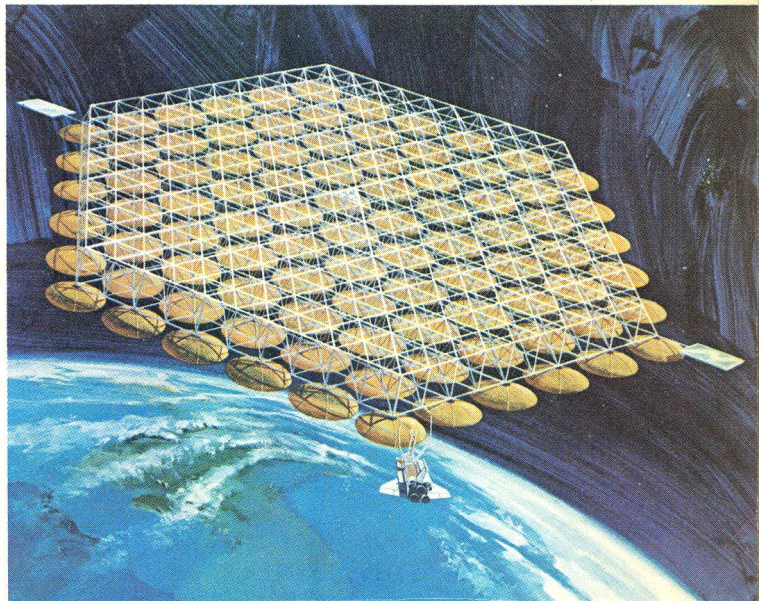
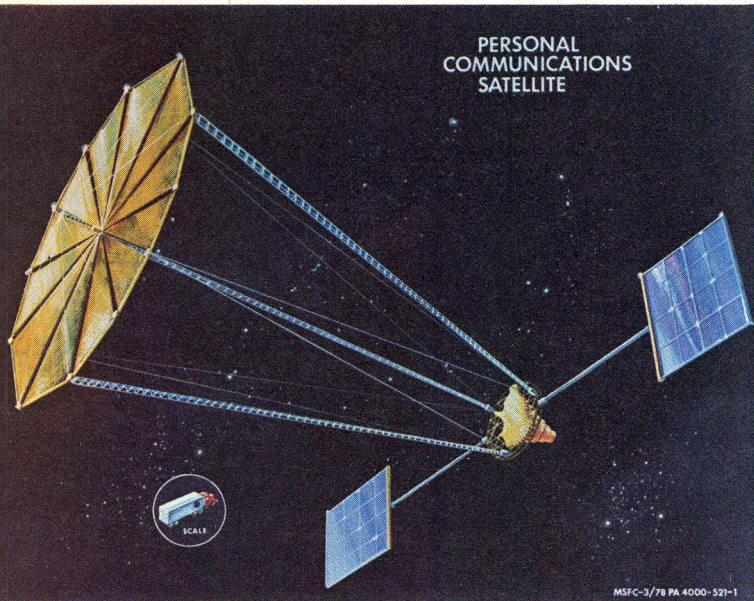
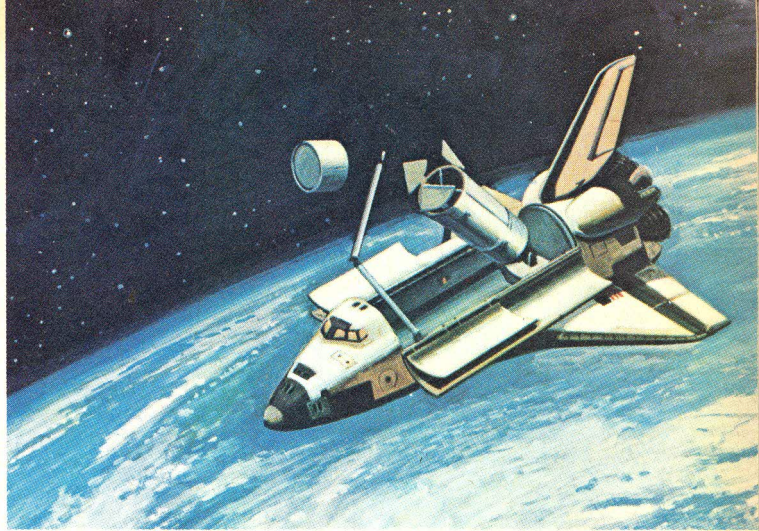
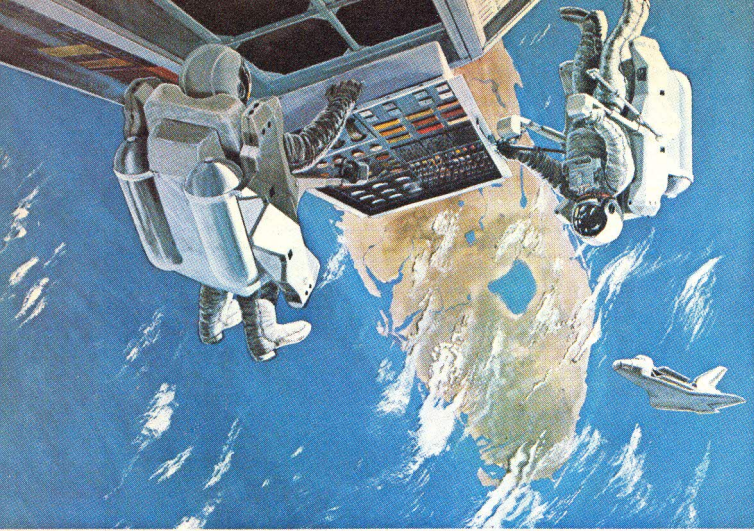
12. Look over the Soviets. Surveying the Earth with a military eye might also benefit from having human observers in space. And it's certain that the U.S. military has a variety of mechanical eyes, ears and noses planned for launching by the space shuttle. The Defense Department will soon have its own shuttle launch site at Vandenberg AFB in southern California. That location will allow the shuttle to fly a polar orbit of Earth—the better for reconnaissance missions.

13. Take laser target practice. For reasons having to do with Soviet laser experiments in orbit, the U.S. military is intensely interested in how lasers function in space. And there is plenty of satellite junk floating around up there, good for nothing more than target practice.

14. Observe (and experience) the effects of zero-gravity on the human body. Without doubt, shuttle crewmembers will follow in the grand tradition of astronaut-as-guinea-pig (certainly to a lesser degree than the early astronauts, but they *are* the most available



Top: Artist's concept of an early industrial park for orbital research activities.
Above: An essential shuttle accessory is the power extension package shown here.



test subjects). Tortuous affairs such as a high-speed, forward-and-backward sledlike contraction have been designed to gauge the combination of weightlessness and acceleration forces. Other, calmer experiments will simply monitor the physical changes known to occur, and exercise programs to counteract those changes will be prescribed and evaluated.

15. Set up a space tug service. Versatile as it is, the space shuttle can only go part way. It's designed to make it to low-Earth orbit, but many of the most promising projects will require people and materials in high-Earth orbit—more than 20,000 miles away. Some kind of space tug—solar electric, chemical rocket or nuclear powered—will be needed to pick up where the shuttle leaves off. Two or three space shuttle flights can loft the tug into orbit in pieces, where it can be assembled and used to ferry goods and passengers to high Earth orbit and back. NASA doesn't have the money for a space tug right now.

16. Spur the information explosion on this planet. Because the shuttle will deliver ever larger and more capable communications satellites to orbit, the volume of information moving around Earth will continue to snowball. Giant antennas or modular "antenna farms" will soon be vying for beaming room

Shuttle astronauts will be able to repair satellites in orbit (top left) and conduct laser experiments in space (top right). Communications satellites will be bigger (left) or giant modular constructions (right).

to send more television pictures, phone conversations, video conferences, computer data and various other bits of information around the globe.

17. Put wrist radiophones on the market. The hardware you wear on your wrist could be manufactured today. But the giant switchboard in space that will make them all work has to be built first. When someone decides to invest in the satellite, the space shuttle can be the truck to the construction site.

18. Build a space station. Start with Space-lab-like modules that can be lofted to orbit in the shuttle cargo bay, add spartan living quarters, a power supply, a communications antenna... and keep adding more. Call it a Space Operations Center (NASA's latest code for space station) or call it an orbital construction shack (another recent, more ambitious label), but establish a permanent human outpost in space.

17. Demonstrate a solar power satellite. Just to see how it works. In times like these, why ignore a potential source of economical elec-

tricity that will last as long as the sun?

18. Open a zero-gravity hospital ward for treatment of burns, fractures and heart ailments. While the launch might be troublesome, a weightless environment is thought to be the ideal place for convalescing victims of severe burns, fractures or hearts that can no longer fight gravity.

19. Research the intricacies of weightless lovemaking. Okay, so it's not in any NASA press release. But take all bets that some enterprising shuttle crewmembers will conduct their own experiments in this new frontier before the decade is out.

20—?? Who knows? What do you think? The most predictable aspect of space shuttle possibilities is that unpredictable things will happen. Put inquisitive human beings in an entirely alien environment and different sorts of events are bound to take place. As we become more familiar with the natural resources of space, more and more possibilities will appear on the horizon. But until people are out there on a regular basis, it's hard to say what potentials may arise. The only certain thing is that new ideas will keep coming.

NASA's space shuttle isn't the final word in space travel. But it will open the doors to an exciting and productive new space age. That is—when it flies!

harlan ellison

AN EDGE IN MY VOICE



ARTWORK © 1980 STEPHANIE O'SHAUGHNESSY

Harlan Ellison attained literary prominence during SF's New Wave period two decades ago. He introduced the world to socially relevant SF via the anthologies *Dangerous Visions* and *Again, Dangerous Visions*. His Hugo and Nebula award winners include "A Boy And His Dog," "The Deathbird," and "Jeffy Is Five." Ellison will be well represented in bookstores this fall with his upcoming *Shatterday* collection (Houghton Mifflin) and Blood's *A Rover* (Ace), a novelization of "A Boy and His Dog."

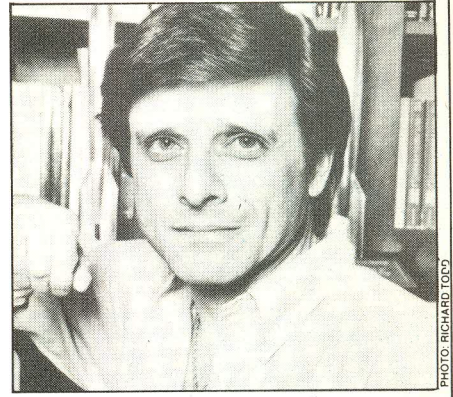


PHOTO: RICHARD TOPP

Darkness falls early. From the horizon comes the wail of creatures pretending to be human. The red tide has come in, and shapeless things float toward the shore. He stands before the altar of Art, naked and with fists raised, and he vows: *I will not be lied to.*

Hello. My name is Harlan Ellison and I am a writer. This is a new home for my words and I'm in the process of moving in. Much of my personal furniture has yet to arrive. I'll be furnishing this space from month to month and though I'm aware some of my taste may not parallel yours, I bring with me several items whose beauty I do not think you will contest. The first is a determination to entertain you.

No matter what comes past my window, no matter what doings and philosophies and people are trapped for comment, I will bring to any discussion of them a resolve to keep your attention. Entropy is fed by boredom; and I am anti-entropy.

The second item already installed is a sense of ethics. I cannot be bought. This magazine has rented my words, but by contract they cannot edit them or change them or try to sway me to say things I would not say of my own volition. Truth is the greater part of these ethics and I will do my best to tell it as I know it. Sometimes I'll be wrong—I can be fooled as easily as you—but I have no doubt you'll let me know when that happens.

The third item I bring to this new residence

is taste. Some have said I have good taste, high standards, a sense of what is worthy. Others have disagreed. I cannot espouse the taste of others, only my own. But I'm told it is that special view that is required here. I seldom agree with the mass, I despise bad writing, meretricious film-making, appeals to the lowest possible common denominator of cheap titillation, attempts to package snake-oil as a cancer cure, and I reject the notion that you are a vast audience of dumb, gullible children who will endorse even the shabbiest product if it comes heavily advertised.

And finally, I bring courage and my talent to this new place. They are as integral to what I will do and say here as are the walls and ceiling of this magazine, the print and paper you hold in your hands.

The courage to defy many of you in your pet obsessions; the courage to consider only the work and how it was produced, even when writing about my friends; the courage to take risks with my own self-interest. I make no grand statements about my fearlessness; it's simply the way I've always done things and I have no control over it. Backed, however, by my talent. I will not dissemble: if I didn't have the ability, you would not now be reading these words. There are many things in this life I cannot do, but there are a few I do very well indeed. One of them is write. I will expend the fullest measure of that talent in your behalf.

It is my intention to write a column each time that will reflect the Real World through a lens of fantasy, that will, I hope, give you a different view of what others try to hype you into accepting uncritically.

That's okay. Millions are spent every year to get you to attend inferior movies, to believe talentless actors are Laurence Olivier, to sell you cheap goods and to bastardize your taste in food, art, life-style, goals and personal relationships. Those millions go to maintaining the status quo, also known as entropy. I am foursquare for chaos; I am anti-entropy. We will have wonderful arguments.

In the months to come I intend to write pieces on the arcologies of the visionary ar-

chitect and dreamer Paolo Soleri, on the magnificent new PBS series *Cosmos* created by Carl Sagan, on the antic sense of humor of fantasy novelist Stephen King.

I know all three of these men, and have shared space and time with them. They may have said something to me they haven't said to others. I'll try to pass those new thoughts along to you.

In future columns I will review some films. I have written for television and films for almost 20 years, and much of the amateur nonsense you're asked to believe prevents you from critically judging what is thrown at you by powerful and monied corporations. My critiques of these films will attempt to go behind the sound and fury of the publicity machines that grind on through the night.

There will be essays on new writers you should pay attention to at risk of your mortal soul, there will be encounters with celebrities and with everyday men and women like yourselves, there will be anecdotes of craziness and danger and even low and high comedy. There will be views of the world around you that will propound the theory that reality and fantasy have flip-flopped; and I will do my best to aggravate you. Not because I am mean of spirit, but simply and directly because *nothing* should be accepted without considering it fully.

In some ways I'm an Elitist. I do not believe that we are all entitled to our opinions. I do believe that we are all entitled to our *informed* opinion. George Orwell once wrote that "The great enemy of clear language is insincerity," and to the end of providing you with clear language that informs and elucidates, I will be sincere at risk of bringing down your wrath on me.

Because, as an Elitist, I believe that each of you has the spark of nobility and change in you. I believe that it is the remarkable men and women in every age who alter the condition of life for all of us, who move us away from the pit toward the stars. I cannot be convinced that Einstein and Elizabeth Cady Stanton and Galileo and Mary W. Shelley and Ralph Nader and Marie Curie were not

better than those around them when they made their contributions to the human race. And I cannot be convinced that among you reading this there are no incipient Einsteins, Stantons, Galileos, Curies and Naders. In each of you, in some way, is the fire that we need to change the course of history. And to stoke that fire I will try to write of things and in ways that will get you aggravated enough to *think*.

All the while keeping you entertained, because that's my job, and I've contracted to do it the best way I know how.

I'll expect your help.


When you stumble across something interesting you think you'd like to see discussed in this space, drop a *short line* to me in care of this magazine. Don't bother sending letters of praise telling me what a swell guy I am. I toss that kind of stuff in the waste basket. As many of you will think I'm terrific as will think I'm a card-carrying creep. Half of you will be right.

Don't bother sending crazy letters. You know the kind I mean: Jesus loves you, I took a ride in a flying saucer, JFK was assassinated by aquatic killers from Atlantis, have you read your I Ching today, didn't we know each other in a previous life, are you the Messiah, Marilyn Monroe is still alive and living in sin with James Dean in Madison, Indiana, will you marry me, are you my long-lost brother, *Star Trek* is greater than *Hamlet*, you are a Communist, how many angels can dance on the head of a pin or the head of Ronald Reagan, whichever comes first and is smaller. You know the kind.

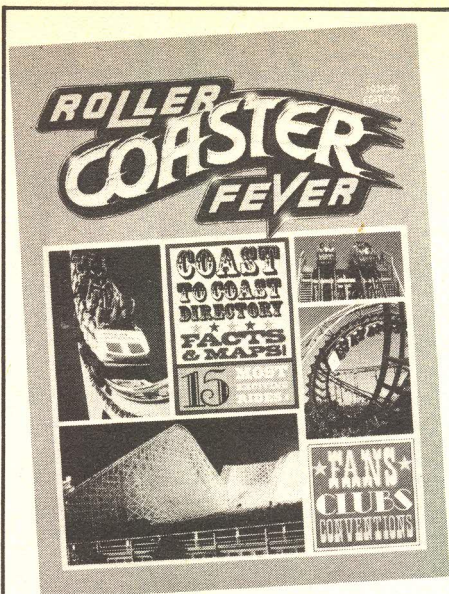
From time to time I will pass among you, my people. I go out into the land frequently, on lecture engagements, and I expect many of you to query me about whatever column has most recently come before your bright little eyes. Make yourselves known to me, but be polite. I have this cranky manner when rudeness manifests itself.

I'd thought perhaps I'd open my first column with a conversation I had with Ridley Scott, the director of *Alien* and *The Duellists*, when he came to visit a few months back; but something he said, about the time being ripe for a John Ford of science fiction films, has stuck in my mind. And I think I'll go into that theory in depth next time.

Or maybe I'll conduct the first interview with Marilyn Monroe and James Dean, direct from Madison, Indiana.

And if you conceive of this opening installment of the column as being terribly mild and polite, reassure yourself that it is only misdirection. From here on in, kiddo, the gloves are off. And so are we. Next time we set fire to the Welcome Wagon. 

EDITOR'S NOTE: Mr. Ellison has been given a free hand to express his opinions. If you don't like what he says, it's not our fault. If you really love his column, we'll take full responsibility. Publishing is funny like that. The content is copyrighted © 1980 by The Kilimanjaro Corporation.



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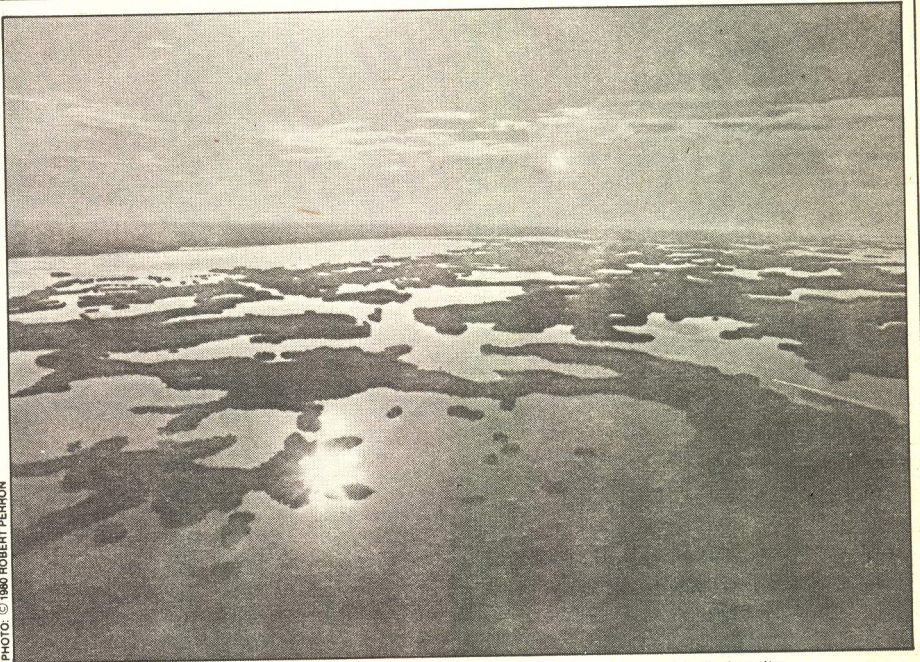
Year of the Coast

There was something strange going on at Fort Macon State Park in North Carolina. It was a few moments past midnight, January 1, 1980. Through the misty darkness, the sounds of a small group of people assembling along the park's ocean beach could be heard. A celebration was taking place. But this was not a typical welcoming of a new year, nor even the marking of the new decade. This group, the Carteret Wildlife Club, was heralding the birth of a year-long effort to call attention to the thousands of miles of America's coastline: the Year of the Coast.

Throughout that New Year's Day, enthusiasts around the country gathered to inaugurate the Year of the Coast. From the rocky ledges of Bar Harbor, Maine, to the fog-enshrouded coast of Oregon, to the palm-lined beaches of Hawaii, activities ranging from beach walks to Polar Bear Club swims kicked off the effort.

There are many good reasons for a Year of the Coast. "Coast" encompasses more than just the perimeter of the United States. There are literally thousands of miles of coastline that comprise the nation's estuarine system (the Chesapeake Bay, for example, is the largest estuary in the U.S., with over 4,000 miles of interjoining coastline), as well as the Great Lakes region. Though we revel in the scenic wonders of the coastal areas, our everyday dependence on and the extreme fragility of the coast must be closely attended to. Anne Simon, in her book *The Thin Edge*, reminds us of the remarkable nature of the coast. She writes that the coast "nurtures fish and shellfish, birds and plantlife, as it nurtures the ocean, the essential source of a third of the world's oxygen, the largest source of its protein." The coast is a series of interlocking ecosystems, made up of land formations, shore and off-shore flora and fauna, bottom areas and the water itself. One does not exist without the other.

In 1972, the Coastal Zone Management Act was signed into law. Combined with other statutes—the Marine Mammal Protection Act, the Clean Water Act and the other federal and state measures—CZMA recognizes the need to preserve these critical areas. Last August, President Carter, in his annual Message on the Environment, paid particular attention to the country's coastlines. Along with an enthusiastic endorsement of 1980 as the Year of the Coast, Carter proposed several initiatives to strengthen the CZMA, which is due for reauthorization this year. Besides a guarantee of a five-year federal support program, the President offered a series of amendments to the law and called on the Secretary of Commerce to systematically review federal policies



The 10,000 Islands, Gulf coast of Florida. Such barrier islands are especially fragile.

concerning coastal management programs.

There are numerous examples of the threats now facing U.S. coastal regions.

Sixty percent of the nation's populace lives in coastal areas; this number is expected to swell to 75 percent by 1995. This means that more and more coastline is being gobbled up by pressing demands for housing, energy, transportation, industry and waste disposal. Landfill has destroyed valuable estuaries, while dredging has wiped out habitats and created water-quality degradation.

Despite regulations imposed by state and federal governments, off-shore waste disposal remains a colossal urban dilemma. Though extreme, the New York City area is a case in point. More than five million tons of garbage and sewage from New York, New Jersey and Pennsylvania are dumped into a bight off the coast of New Jersey yearly. Add to this an extra one million tons of industrial wastes and dredged spoil. And although funding under various pollution-abatement programs has somewhat eliminated the tremendous toxicity of the waste, those waters and their marine life will never be the same.

Cities put further stress on coastlines by locating industry in coastal zones. The growing number of power plants and energy facilities situated near coastal regions poses an extreme predicament. With the nation's expanding demands for energy and our present reluctance to import it from overseas, environmental arguments become overshadowed. Warm-water discharge from such plants is well known for its debilitating effect

on marine life. The discharged water, heated by as much as 20 degrees, can promote overgrowth of surface plankton and destroy large numbers of fish. Even so, approximately 100 new fossil fuel and nuclear plants are planned for coastal areas in the next 15 years.

Environmental concerns are also being back-burnered with regard to off-shore oil drilling, which is rapidly becoming regarded as America's answer to ending foreign oil needs. The world witnessed one of the largest oil spills in 1976 when the *Argo Merchant* ran aground off Nantucket, dumping 7.6 million gallons of oil into the sea. This horror was dwarfed, however, about a year later when the *Amoco Cadiz* broke apart off the coast of France, spilling more than 67 million gallons of petroleum, much of which made its way to the beaches, estuaries and marshlands of the Brittany coast, with disastrous consequences. And Ixtoc I, the Mexican off-shore well in the Gulf of Mexico, erupted last spring and began pumping thousands of gallons of oil into the sea daily; ten months later the well was finally capped. With more than 50 million gallons of crude mucking up the gulf, Ixtoc stands as the largest spill in history. Still, plans are underway to set up off-shore rigs in such critical areas as Georges Bank (off the Massachusetts coast), an area which supplies a large portion of the world's fish, and Alaska's Beaufort Sea, posing a serious threat to the existence of the endangered Bowhead whale.

There is certainly no denying that this

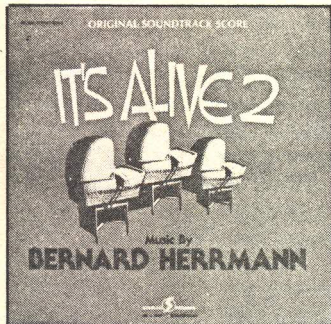
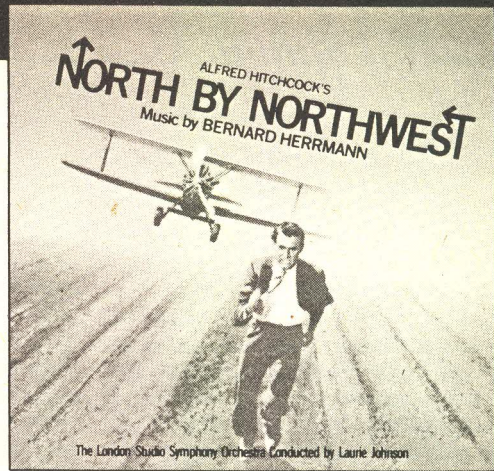
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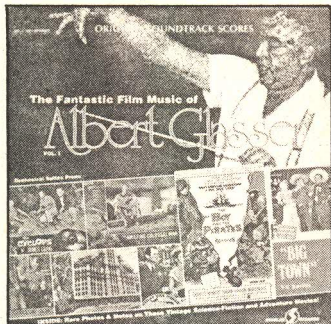
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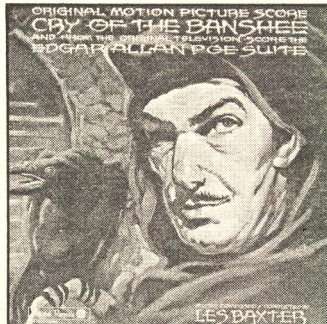
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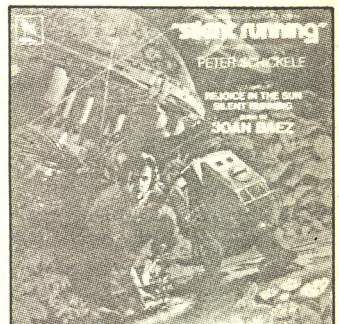
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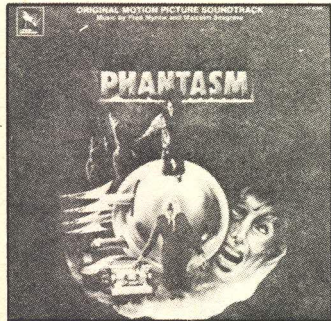
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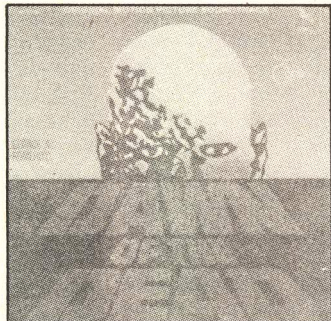
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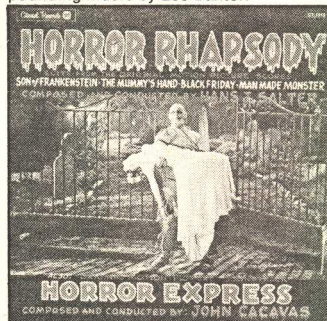
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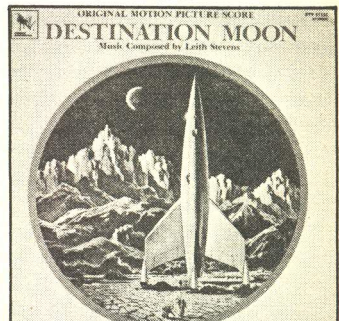
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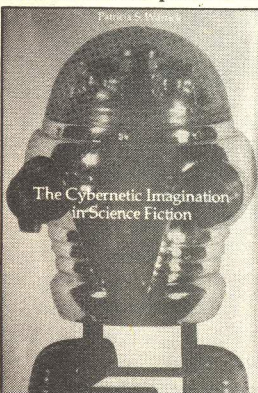
Future Machinations

Cybernetic Scholar

Critics have accused SF writers of multitudinous literary sins, but in **The Cybernetic Imagination in Science Fiction** (\$15 in hardcover from MIT Press) Patricia Warrick comes up with a new charge. In this lengthy critical essay this literary lady insists that SF's dismal predictions about artificial intelligence and the human future demonstrate that, in this field at least, the genre simply hasn't done its homework.

Ms. Warrick traces SF's portrayals of intelligent machines—robots and computers—from the pulps to the present and discovers that the majority response to these electronic aliens among us has been a surprisingly reactionary pessimism.

In the earliest days of the pulps, she finds that most robots came on like Frankenstein's monster. Then came the '30s and the halcyon days of our robotic relationships. That was when writers like Asimov (of course), Lester Del Rey and others began writing optimistically about the future of human-robot partnerships in stories like Asimov's "Robbie" and Del Rey's "Helen O'Loy." But the war years and the paranoid's paradise of the '50s soon brought a wave of darker speculations about the possibilities of machines.



This post-World War II tendency toward a dystopian vision of a future where the machines take over and enslave humanity or even destroy it disturbs Ms. Warrick (and many an optimistic reader, too). She insists

that to be so uniformly pessimistic, SF writers have had to turn an obstinately blind eye to the many positive possibilities of information theory and computer technology. Put simply, she's saying that a good many SF writers aren't talking about possible futures. In fact, they've ignored the present realities of a science for their story's sake.

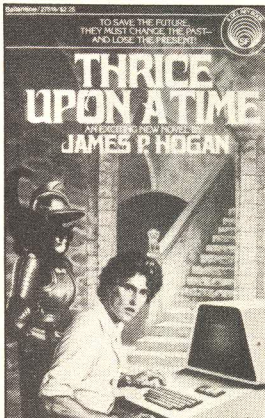
But Ms. Warrick sees some positive signs in the fiction of the '60s and '70s. Citing Delaney's *Nova* and Einstein *Intersection* and Frank Herbert's *Destination: Void* she sees a new level of sophistication and a return to hopeful possibilities in the genre.

This book is written in classic thesis (read

dry and often pedantic) style, but some of its points are telling ones. Her final question, though, seems to be very important and singularly neglected. She wonders if science is evolving so quickly that SF's imaginings can no longer keep up, much less speculate about the future. I think the books that follow will answer her question.

Computer Adventure

One thing Ms. Warrick may have underestimated is the synergy of science, scientists and science fiction. Scientists have always formed a significant part of the SF community—both as author and audience—and as the computer sciences have grown, some of the computer scientists have sat down at their terminals and hammered out the odd SF epic. One of the prime exam-



ples of this new breed of scientist-writers is James P. Hogan, once a systems designer and now a full-time writer.

In his latest idea-fest, **Thrice Upon a Time** (\$2.25 in paperback from Ballantine/Del Rey), Hogan spins a tale of a time-tripping computer that saves and changes the world from a castle basement in chilly Scotland. The computer that stars in this temporal puzzle is able to communicate with itself through time. Lee Walker and Robert Murdoch, freelance physicist/computer whizzes, have been summoned by Murdoch's grandfather, the inventor of said computer, to help him figure out what to do with it. What they do is save the world from a mysterious plague, from a hail of accidentally produced mini black holes and what promises to be an unending series of international disasters.

Now all this takes a few twists on present-day physics, but making those believable is the key to Mr. Hogan's popularity. Sadly, scaring us with his impending dooms or making us empathize with his characters are not yet among his strengths. Like his earlier novels *The Genesis Machine* or *The Two Faces of Tomorrow*, *Thrice Upon a Time* is straight-ahead science adventure and like those earlier efforts the idea will keep you going even when the characters get a little

clunky. Each of his books has been a little better than the last and watching Hogan find his voice is almost as much fun as trying to guess where his peripatetic curiosity will lead him next.

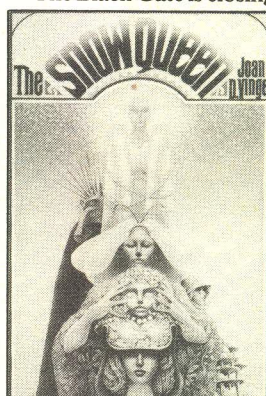
Royal Romance

Scientist-writers aren't the only ones taking a more enlightened view of the more fantastic possibilities of computer technology. In **The Snow Queen** (\$10.95 in hardcover from the Dial Press) Joan Vinge combines a galactic computer with human terminals, immortality for sale, a queen who's the ultimate in corruption, and an innocent young woman's quest for love. The riveting result is a startling and beautiful SF epic that makes just the sort of imaginative quantum leap that Ms. Warrick's looking for.

Arienhod is the Winter Queen of Tiamat, and on Tiamat, Winter reigns for 150 years. During Winter's reign, the black hole that Tiamat's system orbits is an open gate to the rest of the human universe. Hegemony—all that's left of humanity's Old Empire—comes here to trade technological toys for the Winter Queen's water of life—an elixir of immortality made from the blood of Summer's sacred mers.

The Black Gate is closing now and it is time for Summer to rule. But Arienhod thinks that this time things will be different. She intends to remain on the throne even after Hegemony's minions are gone, defying Summer and the Change.

This book is a noble quest, a consummate piece of world making and a full serving of surprise and wonder. It has action, imagination and a cast of characters who will keep you turning pages and wondering if you really do need to go down for supper today. Ms. Vinge has fulfilled the promise of her earlier books with a big beautiful novel, and I wish I could tell you more, but none of the surprises should be spoiled.



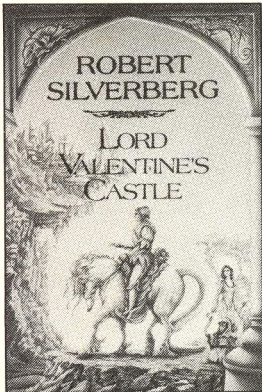
Strange Quest

Arthur C. Clarke says that if a technology is sufficiently advanced, you can't tell the difference between it and magic. On Majipoor that's exactly the case: you can't tell where the

magic stops and the technology begins.

Majipoor, a huge bubble of a planet that would dwarf a hundred Earths, is the scene of Robert Silverberg's newest novel, **Lord Valentine's Castle** (\$12.95 in hardcover from Harper & Row). This is a world of strange contrasts. There are spaceports and wizards, knights in armor who carry swords and energy-throwers, and ride genetically restructured beasts. It has a population of billions that includes creatures from an assortment of worlds—four-armed Skandars, tentacled Vroons, Metamorphs and the ruling aliens, the humans.

Majipoor is ruled by Four Powers: the Coronal administrates justice from atop the 30-mile-high Castle Mount; the Lady of the



Isles sends sweet dreams from her chambers; the King of Dreams punishes the wayward with nightly visions of horror; and far beneath them all the Pontifex runs the planet's massive bureaucracy from deep within the subterranean Labyrinth. This is a system that's worked for 11,000 years, but now a fraud wears the body and crown of the Coronal while the true prince roams his land as a lowly juggler, his body and memories stolen from him.

There's never been a revolution here. The last war is a barely remembered piece of history, but Lord Valentine must fight his way to the top of Castle Mount from the bottom of this bizarre society.

This is an epic quest in the grandest tradition, a saga full of strange adventures and stranger sights. But it isn't a suspenseful or even very exciting novel. Men and monsters die with nary a whimper and the reader may be surprised to find that he just doesn't care very much that they're gone.

This is Mr. Silverberg's return from a writing hiatus of several years and while it's a handsome, well-written adventure it lacks the fire to be the classic that many of us were waiting for.

Ringworld Rescue

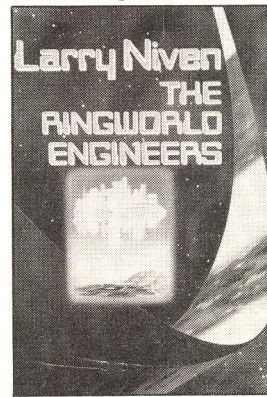
In a genre noted for its inventiveness, Larry Niven is an inventor on a singularly grandiose scale. In 1971, he won both the Hugo and Nebula awards for *Ringworld*—a novel played out on what has to be the biggest set in history, a ring a million miles wide and 600 million miles around with a sun stuck squarely in the middle. The prose may not have been

the greatest, but who could resist the idea?

Since then, Niven has been presented with engineering analyses, socio-psychological studies and a barrage of who-what-where-when-why-how queries about his creation. Well folks, you drove him back to his typewriter and here's the result—**The Ringworld Engineers** (\$9.95 in hardcover from Holt, Rinehart and Winston).

Twenty years have passed since the intrepid Louis Wu, the genetically lucky Teela Brown and kzinti diplomat Chmee accompanied a mad puppeteer to explore the largest artifact in the universe, and now Louis and Chmee have been kidnapped by yet another puppeteer to save that same artifact from crashing into its sun.

But the years have not been kind. Louis Wu is a current addict (juice straight to the brain's pleasure center—"one of mankind's newest sins"), Chmee a graying grandfather and this puppeteer much madder than their last accomplice. But this unlikely trio and their accidental allies do battle across a dozen of the Ringworld's worlds, solve several of the mysteries of the enigmatic structure and finally arrive at a suitably awesome use of an unstopable force on this immovable object.



The Ringworld is possibly the most completely researched world in SF and this tour should go a long way toward answering all those bothersome questioners for Mr. Niven. But for those of us who are more tourist than physicist, this is an eminently satisfactory trip through Mr. Niven's fantastic world.

Capricious God

John Varley is one of SF's newer imaginers and in *Titan* he created a living world—a creature named Gaea who's more than 5,000 kilometers around with more than a half-million square kilometers of living space inside her. And Gaea has populated this space with a host of creatures built to suit her whims—ranging from the sexiest centaurs in space to a host of razor-winged buzz bombs who'll cut you down just for the fun of it.

In her first alien encounter, Gaea forced Earth astronaut Cirocco Jones and her friend Gaby on an odyssey that would have turned Ulysses pale. And when Cirocco was successful, Gaea made her an offer she couldn't refuse—a long and dangerous life as Gaea's wizard.

Now Cirocco and Gaby are off on another

adventure in (aptly) **Wizard** (\$11.95 in hardcover from Berkley).

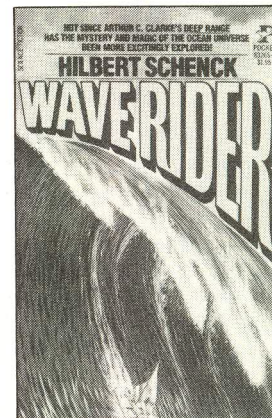
A few years have passed since Cirocco arrived, and nowadays Gaea is passing out miracle cures to those who will come to her and become heroes—you know, slay a dragon (there are a half-dozen wandering around), free a damsel in distress (her version of King Kong always has one or two tied up) or do any one of those historically heroic bits of self-destruction. Cirocco and Gaby pick up two of these fledgling hero-types for an around-the-body tour: Robin, an epileptic witch from a lesbian separatist space colony whose seizures are triggered by gravity, and Chris, a young man who has manic episodes where he becomes very aggressively affectionate and extremely lucky.

These four and a crew of those aforementioned centaurs head off into Gaea's wilds on what seems to be an innocent enough tour, except that things keep trying to kill them. Maybe it's because they're plotting to kill Gaea—or at least the part of the world's mind that calls itself Gaea.

You think it's hard to fight city hall, you should try going one-on-one with a god—especially a god that loves prime time TV and practical jokes. Varley is a unique talent and this book is a real pleasure even if it does end too soon. There will be a final volume of the *Titan* trilogy, but it just can't possibly get out soon enough to satisfy me.

SF at Sea

One of the newest practitioners of hard-science extrapolation is Hilbert Schenck and



Wave Rider (\$1.95 in paperback from Pocket) is his debut. *Wave Rider* is five unique new stories linked by their common universe—the sea—and not since Arthur C. Clarke's *Deep Range* has anyone taken such a penetrating, understanding look at this other world that surrounds us.

In his opening story, "The Morphology of the *Kirkham Wreck*," a surfboat captain manages a daring rescue by becoming one with time as well as the ocean. Schenck adds a cautionary tale in "Three Days at the End of the World" where a slightly scatter-brained professor discovers that we've doomed the oceans and ourselves. "Buoyant Ascent" continues this slightly shrill, too clever polemic tone in another rescue story—this

time they save the crew of a downed submarine from an impossible depth.

"Wave Rider," though, is a real treat. Sailing addicts have always waxed rapturous about the personality of this or that boat. Joe Spanos dreams of riding a huge, hundred-foot-plus wave in a record-breaking trip across the Pacific. He lost his wife on his first try. Now he and his interactive trimaran, *Wave Rider*, are going to try again. An interactive boat is one that talks to you, takes in the data about the waves and the wind from the satellites and the meteorologists and tells you just what you need to know. *Wave Rider* will take you for a ride I defy you to forget.

"The Battle for Abaco Bay" is a fine conclusion for this collection, as it uses the sea, controls it for once. And while the people of Abaco Bay use a computer to tame the ocean, they find that it takes a lady with a talent for

riding the somewhat wilder waves of international politics by using political cocaine to guarantee their survival in the end.

This book is a very auspicious debut for this young writer. His prose and his people get a little rough sometimes, but his ideas are pure gold. And even if you're not a Horatio Hornblower fan, this book will win you over.

Seminal Science

Now if you're wondering where these folks get all their ideas, The National Academy of Sciences has just produced the perfect crib book for budding science fiction writers (or readers for that matter)—**Science and Technology: A Five-Year Outlook** (\$9.95 in paperback from W.H. Freeman and Co.).

Several hundred distinguished scientists and engineers put together this report on the state of the art in *all* the major fields of science

and technology. This book doesn't analyze, it just states the facts and some of the possibilities for the very near future.

The book covers everything from geology and planetology to the structure of matter, from computers and communication to energy strategies and options, from materials processing to biological systems, and then it talks about the national and international implications of all these issues for the near future. This is a complete (though conservative), well-written (though sometimes as unreadable as the hard parts of *Scientific American*) survey.

The authors note in the introduction that "science and technology continue to transform our world," and this book will enable you to better understand, participate in, and maybe even get one step ahead of that transformation. E

Books in Brief

The Aquarian Conspiracy by Marilyn Ferguson (\$15 in hardcover from J.P. Tarcher/St. Martin's Press). Marilyn Ferguson, editor of *Brain/Mind Bulletin* and author of the highly successful *Brain Revolution*, has written a rosiely optimistic book. While spiritual seekers and change agents may find some encouragement in its pages, *The Aquarian Conspiracy* is not exactly a rigorous social analysis.

Ferguson's prime contention is that a leaderless "Aquarian Conspiracy," its members transformed by personal spiritual insights, is working to bring about a holistic, loving, spiritually aware, socially responsible future. And will succeed!

The Aquarian Conspiracy is a wide-ranging survey, touching on issues including work and productivity, health, brain physiology, bureaucracy, education, and philosophical paradigms for the "transformation." Unfortunately, Ferguson is all too ready to translate human potential movement hopes into reality. Ferguson itemizes our institutional failings, and describes the goals of what she calls the "radical center."

Ferguson's transition from our current reality, which she sees as rather bleak, to our ideal future is a bit hazy. She cites one hundred companies using flextime as if to imply that the social transformation of work is at hand. Werner Erhard's nebulous Hunger Project is used as a major example of social action. Ferguson implies that attitude change in a group of mostly upper-middle class people with few financial worries will create sufficient leverage for major changes. While attending to the Ecotopia craze, she seems blissfully unaware of the trends toward rabid ambition among the educated young in an

creasingly tight job market.

Ferguson's energy and optimism are almost contagious—but wishing won't make it so. Potential conspirators out there will have to wait for a really tough-minded book.

(Barbara Wechsler)

Engine Summer by John Crowley (\$1.95 in paperback from Bantam). One of the major purposes of most post-atomic-war stories is usually to comment on some aspect of today's society. In *Engine Summer*, author Crowley imagines what the scattered remnants of humanity hundreds of years after the final war would make of the non-disposable artifacts of 20th century America. And he comes up with some clever answers.

In his particular future history, the survivors of civilization's collapse wandered for several years until they finally settled in small, isolated communities, establishing new cultures far different from one another. However, one of the few things they do have in common is the mythology of the "angels": inhabitants of a strange world long gone who rushed from place to place, laboring frantically to perfect magically mechanical tools, the purposes of which are only dimly comprehended by their ancestors.

The novel focuses on Rush That Speaks, a young man who has been brought up in a tiny village of "Truthful Speakers." His ambitions are twofold: to become a "saint," one of the few who truly understand their past and present, and to find a young woman who left the village several years before.

As Rush proceeds along his journey, both he and the reader gradually begin to understand the forces which move his society. *Engine Summer* is one of those rare books that can force the reader to think without

becoming pretentious, and which has a surprise ending that really is a surprise.

(Barbara Krasnoff)

Aliens edited by Gardner R. Dozois and Jack M. Dann (\$2.25 in paperback from Pocket Books). Science fiction anthologies are a dime a dozen these days, and most of them aren't worth that much. However, Messrs. Dozois and Dann have collected 11 well written and extremely imaginative short stories that feature aliens of every shape, size and hue. And considering that a huge amount of science fiction does deal in some way with our possible neighbors in outer space, they are to be congratulated on their choices.

The stories are, for the most part, varied in both style and content. Four short-shorts by Larry Niven explore an alien-populated bar; in "We Purchase People," Fred Pohl explores a frightening penal possibility; in "Guesting Time," R.A. Lafferty pokes fun at the population explosion; Alice Sheldon, in the persona of James Tiptree Jr., postulates a malevolent sexual pull between humans and extraterrestrials in "And I Awoke and Found Me Here on the Cold Hill's Side"; and in "Be Merry" by Algis Budrys, Earth is devastated by disease brought unintentionally by shipwrecked space travelers. Other authors represented here include Edgar Pangborn, Philip K. Dick, Frederic Brown and Damon Knight.

In addition to a fine collection of fiction, the editors have also provided what they admit is an incomplete but wide-ranging list of science fiction dealing with aliens, indicating which of these they consider the best. It is a good guide for novice science fiction readers.

(Barbara Krasnoff)

Raymond Crane

While many space artists concentrate their energies on the scientific and/or science fictional qualities in their work, Raymond Crane dedicates himself, first and foremost, to his art. When asked to describe one of his paintings, he proceeds to explain his method of artistry.

"The important thing to me," he says, "is the plastic quality of the paint itself. I like to deal with line, shape, mass and texture—the elements that compose a picture and how they go together; and space painting really allows me to do this. It's of more interest to me actually than the subject matter, although the astronomical subject allows me to use the elements that are required to create a painting.

"For one thing," he grins, "I love black. I just love black, and space paintings allow me to use this, because there's so much black. And I love contrasts. You take the light side of a planet and there's a very bright contrast to the black of space. There's the polarity of the texture against the soft airbrush, the polarity of the light bright against the black... I like the polarity. And in a sense that's mainly what my paintings are about: polarity and contrast."

The 37-year-old artist has a varied history which includes both artistic and astronomical studies. "I do everything late," Crane shrugs. "I've been in school forever. I started out studying physics, then I studied philosophy for a while... I've been along a circuitous route."

About five years ago he got a job with Boston's Hayden Planetarium. "I work on the production staff. We have a producer and a photographer and special effects people, and my job is to oversee the visual presentation.

"Before I started working for the Hayden Planetarium," he



continues, "my background was quite different. I was mainly a figure painter, working at a style that may vaguely relate to science fiction in the sense that they looked remotely pre-Raphaelite.

And then, in the course of about a year of working here, it sort of took hold and I started doing these kinds of pictures at home... this must have been about four or five years ago. I was doing


it at a very low level at first, sort of experimenting, not thinking about it. Then a couple of years ago I started to take them to science fiction conventions, and people liked them."

In "The Same Coin," the following centerfold, we are witnessing the demise of a star. "There's a planetary nebula in the background," explains Crane. "That's a star that has puffed off its outer layers." He considers for a moment. "Well, I suppose it's not really puffing at all, it's more explosive than that. But a star of approximately the mass of the sun, or maybe a little more, blasts off its outer layers when it's in its death throes, and creates this expanding ring of outer atmosphere, of expanding gases. It is these gases that are illuminated by the leftover, central star. And that's what we're looking at from the vicinity of some hypothetical, very remote planet.

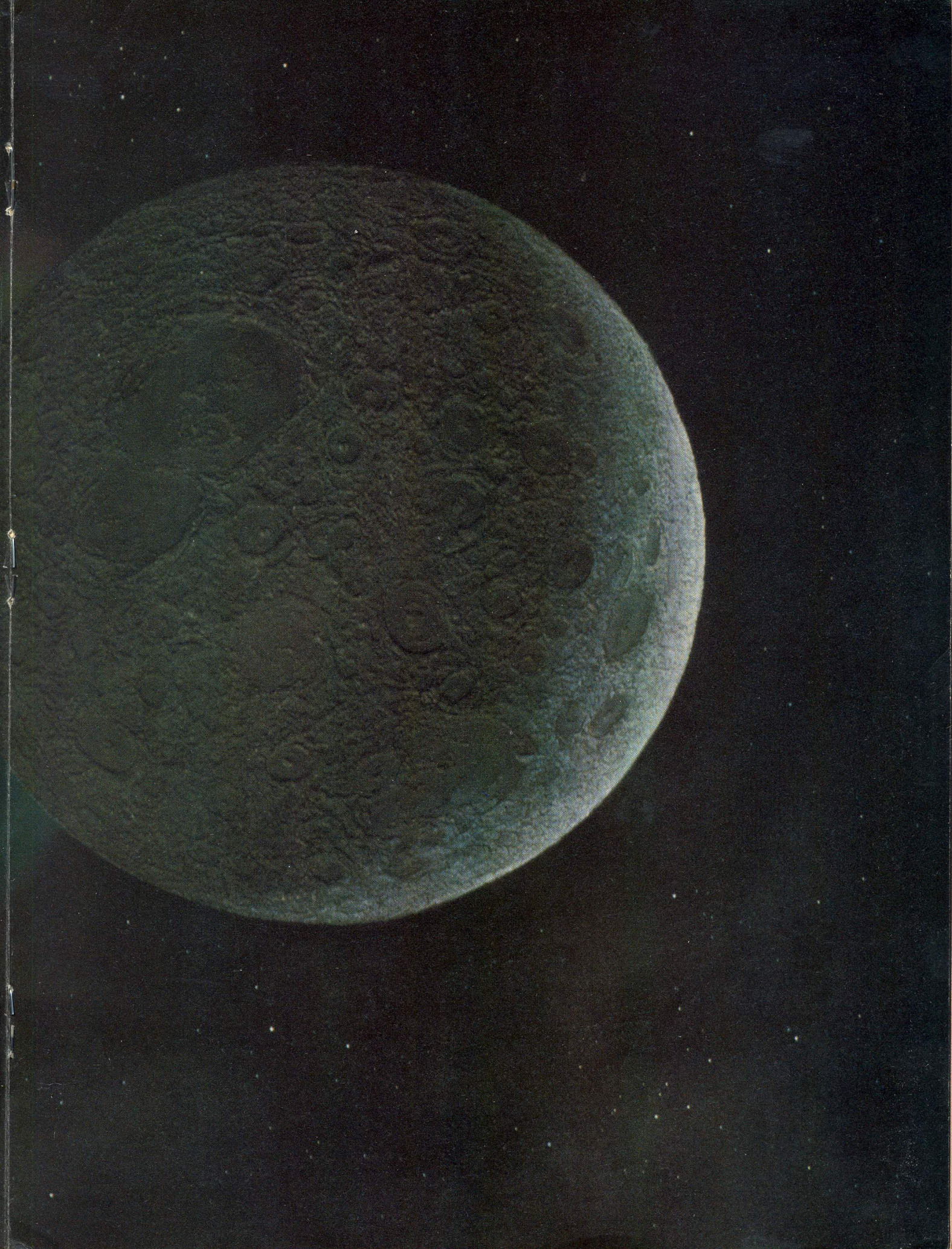
"Gottlieb's Star" [this page] is sort of a big brother to the planetary nebula, because this is a supernova.

"It's strictly a question of the size of the star that determines how they die. Some stars that are smaller than our sun really go out with a whimper, you might say, and the ones with a mass two and a half or three times larger than the sun go off with a bang."

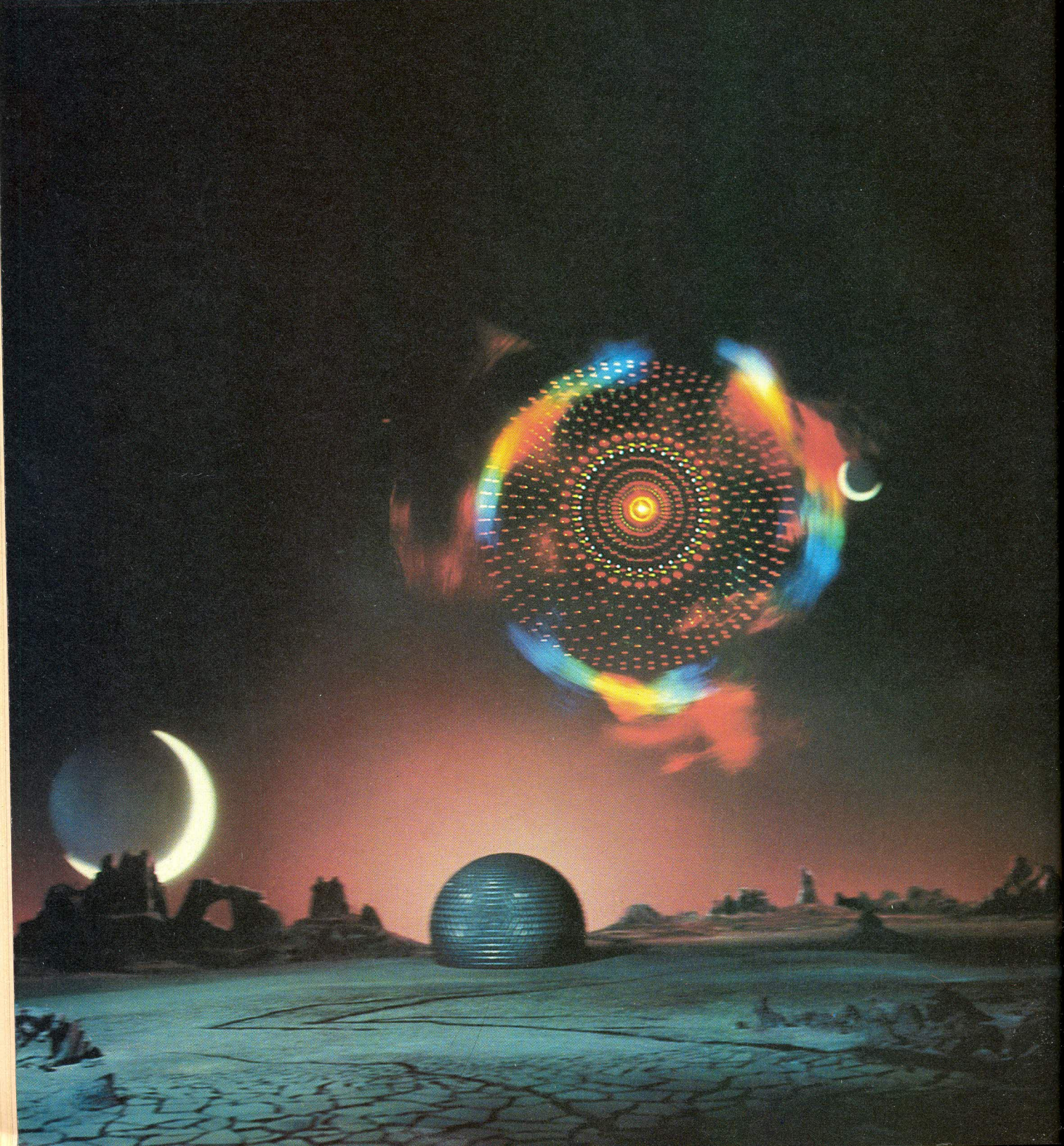
With such an interest in space, it is logical to wonder about Raymond Crane's thoughts on our present space program. "Disappointed," he says simply. "We get NASA reports here, and it's always about some program being cut back or eliminated totally. It's quite sad."

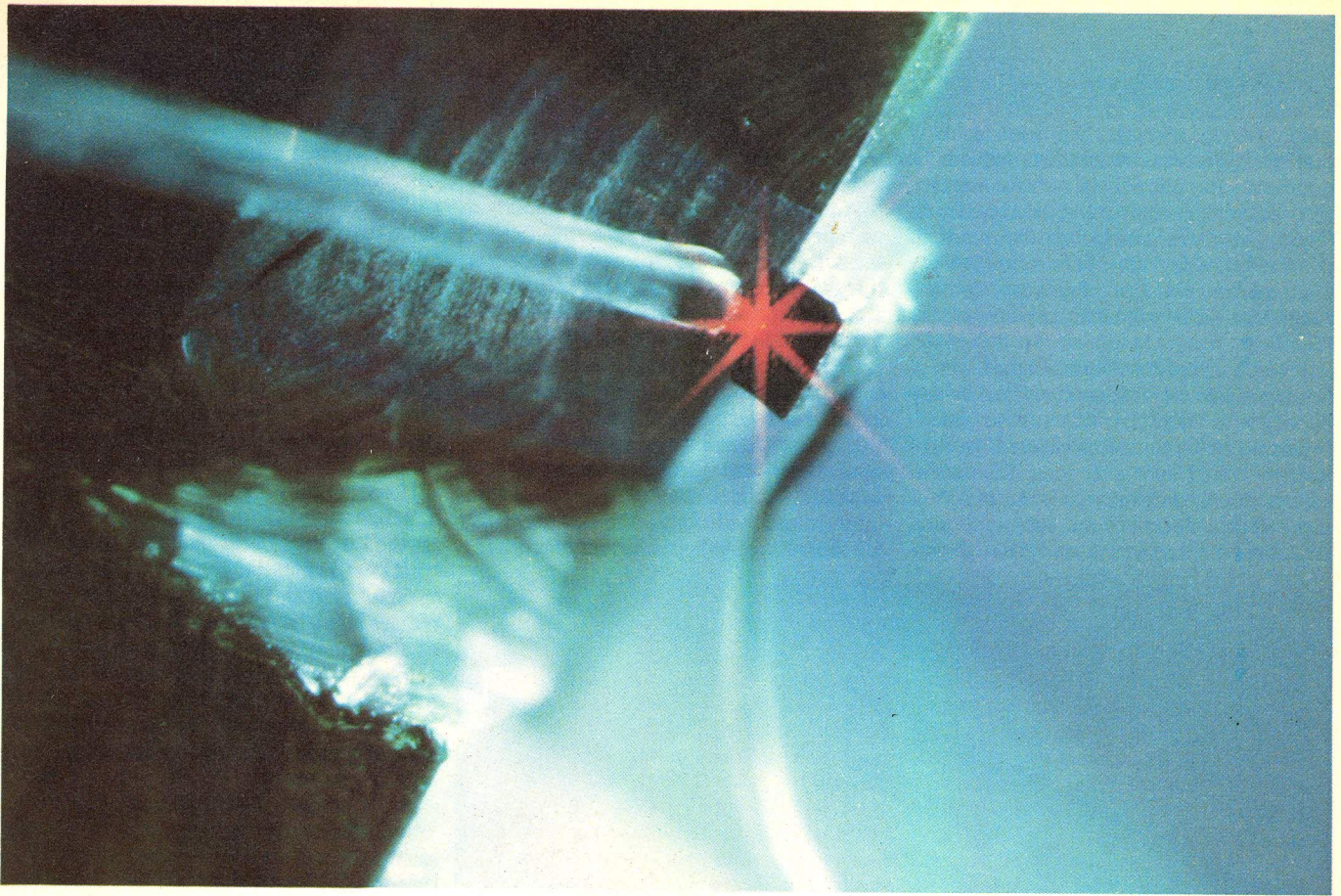
And how to improve the situation? "Things like FUTURE LIFE magazine and all the different magazines. People producing art that, if it's *seen* a lot by a wide range of people, will at least keep the spark alive." 

ART © 1980 RAYMOND CRANE



LASERS





By NED MADDEN

"...Then, advancing obliquely towards us, came a fifth. Their armoured bodies glittered in the sun, as they swept swiftly forward upon the guns, growing rapidly larger as they drew nearer. One on the extreme left flourished a huge case high in the air, and the ghostly terrible Heat-Ray I had already seen on Friday night smote towards Chertsey, and struck the town. . ."

—*The War of the Worlds*,
H.G. Wells, 1898

Left: The Omnidome, the ultimate center for laser entertainment as imagined by Ivan Dryer, founder of Laser Images. Above: The dark, square shape in the center is a small semi-conductor laser which emits an intense coherent beam of light. The light is then transmitted along the hair-thin fiber at left. This photo is greatly magnified; the laser is actually smaller than a grain of salt.

With those words H.G. Wells put the energy beam into show business. When the laser beam was invented 60 years later, the general public had a ready-made conception about what it was—a death ray that could be used to vaporize flesh and metal instantaneously.

Even though that image remains popular today, there was another science fiction story written by a Frenchman nine years before Wells' classic tale that more closely resembles the eventual reality of the energy beam.

In 1889, Jules Verne published a futuristic story entitled "In the Year 2889." Verne filled his story with marvellous inventions set in Universal City, formerly New York and now the world capital. He described skyscrapers, broad avenues with rolling pavements, television in every home with reports from neighboring planets, and colored advertisements projected on clouds.

Before the laser energy beam is used to annihilate armies and cities and satellites it will be used to write full color advertisements on mountainsides and cloud banks. In fact, the laser is already doing quite a job projecting graphics displays 20 feet long on the sides of buildings all over the world.

In Benghazi, Libya, the grand spectacle of outdoor laser projection for a large public event prompted the government of Libya to commemorate its tenth anniversary by purchasing two permanent real-graphic laser projection systems from Laser Displays, Inc. of Boston. LDI consultants installed the laser projectors in Benghazi to display graphics ranging from Arabic script to children's

entertainment on the sides of public buildings.

M.A.S.S. Laser of Canada has a 45-foot double axle bus ready to tour the United States skywriting, augmenting fireworks displays and performing at fairs and trade shows. The \$2 million vehicle is equipped with four krypton gas lasers (for red, yellow, green and blue) and one argon gas laser (for blue and green) capable of generating three to four watts of power per line.

At the halftime of the 1980 Orange Bowl game, Laser Images of Van Nuys, California, used two 20-watt argon lasers to bathe the football field in a luminescent blanket of shimmering laser light.

In the 1980s the laser is coming into its own as our first energy beam tool with endless applications in medicine, high industry, advertising and entertainment. While military research to use the laser as a weapon to knock out missiles and satellites by burning up their electronic circuitry is still in its infancy, more beneficial laser uses exist right now.

The laser carries telephone calls, welds the steel sides of ships and the underbellies of automobiles, aligns long stretches of pipe, analyzes blood, cuts cloth, cauterizes ulcers, reads supermarket package labels, repairs damaged retinas, measures interplanetary distances and prints newspapers.

Geneticists use laser scalpels to drill delicate holes in the cells of bacteria to extract materials for examination. Doctors at the Medical College of Virginia use laser beams of invisible infrared light to vaporize tumors. Bionic laser canes, costing \$2,000, help the blind to walk by bouncing light off objects 15

feet above, in front of and beneath them.

Lasers are playing an important part in the integration of computer and communications technology, with the home as the focal point. Energy shortages will soon demand that many everyday routine transactions be done over the phone, via home computer. The telephone allows the computer to "speak" to other computers thousands of miles away, using the phone system as the vital transmission link. Replacing conventional wire cables will be fiber optics carrying laser light.

Fiber optics are glass fibers less than 1/50 of an inch in diameter—about the size of a sharp pencil point. These glass fibers are so optically pure they can transmit modulated beams of laser-generated light over long distances at very high transmission rates. At the same time, optical fibers are not subject to electromagnetic interference and related pro-

blems that currently exist with wire cables.

Fiber optics' importance lies in the trend toward turning analog transmission signals into their digital counterparts. Transmitting information digitally allows more efficient integration of voice, data and video signals with less errors and no signal degeneration.

Another benefit is the increased ability to manipulate the signals into an "efficient" state—in other words, to compress them so that many conversations can take place using a single telephone line. The conversations will be transmitted during the tiny pauses that each of us constantly makes while speaking.

Probably the greatest use of lasers today is in art and entertainment. In the home, the Magnavox videodisc system player uses an optical laser-read videodisc which stores up to 54,000 separate frames on one side. Platinum-colored videodiscs, the size of 12-inch LP records, carry their information in pits on

the surface of a silvery reflective layer buried within the plastic disc.

The information is retrieved by an optical scan system that trains a tiny helium-neon beam on the disc and senses the difference in reflectivity between the pits and the unpitted spots on the disc's reflective layer.

As exciting as these developments are, they lack the visual drama and emotion of an H.G. Wells marauding Martian equipped with a devastating Heat-Ray. So to the laser light show entrepreneurs falls the task of firing the public imagination with spectacular laser entertainment. According to some experts in the field, the laser light show will soon be as much a part of the national consciousness as a Fourth of July fireworks display.

Recently, a dozen of the fledgling laser entertainment industry's companies gathered at the Las Vegas Convention Center for the first annual International Entertainment Exposition. To the men who run these companies lasers have a meaning almost beyond the comprehension of the general public. To survive they have had to develop a rare combination of business, scientific and artistic acumen. At that, even the most successful can ill afford to relax. Too many things can, and do, go wrong.

"The laser as an entertainment tool is at about the same place the motion picture camera was in 1905," says Ivan Dryer, who heads up Laser Images of Van Nuys, the largest of the laser entertainment firms with 80 employees.

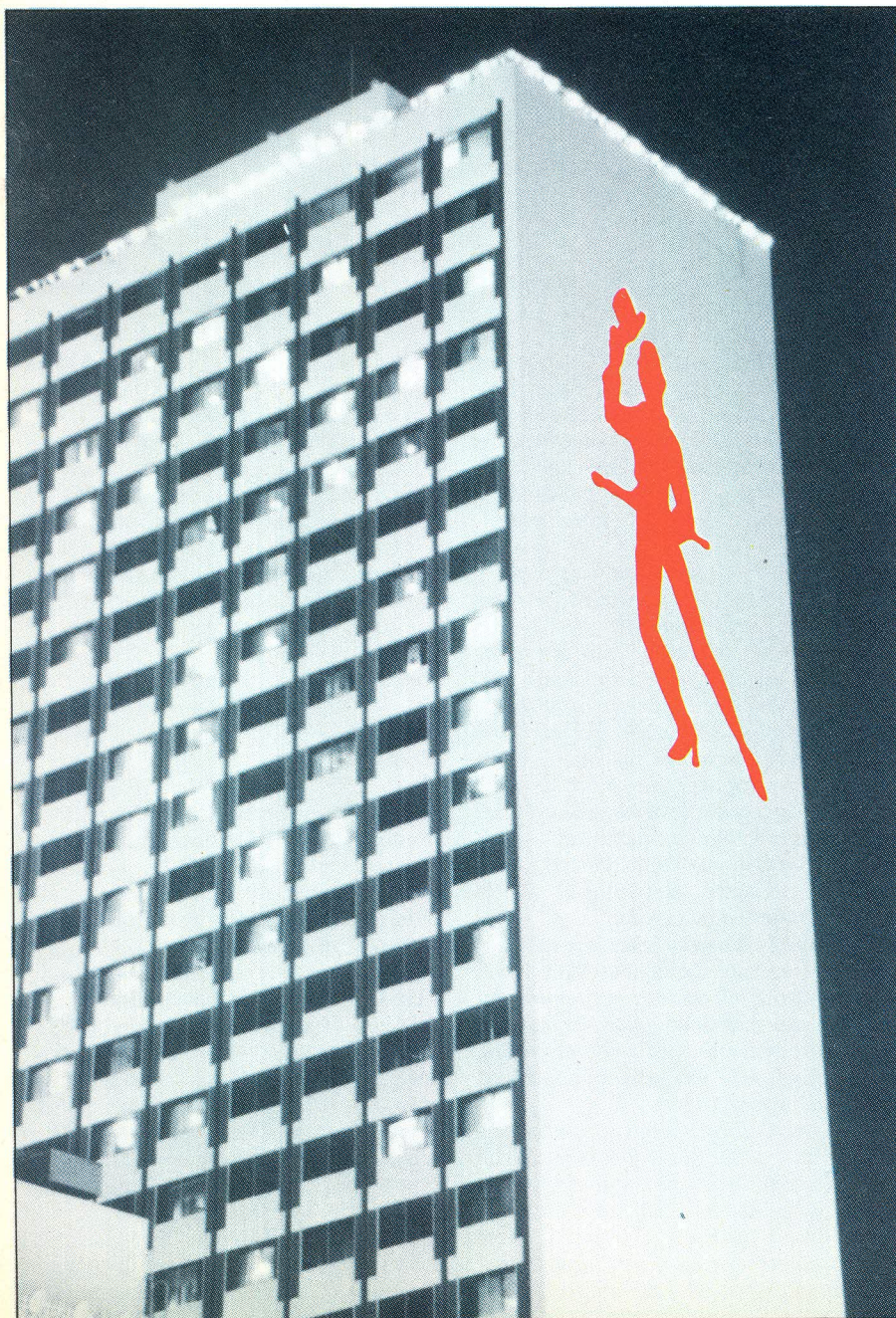
Dryer, whose company produces the Laserium shows in planetaria in the U.S., Canada and Europe, called for tax breaks for the entire entertainment industry to encourage research and development to move laser equipment beyond its infancy.

Laser Images reports annual ticket sales of about \$3 million, but Dryer asserts that cash flow in the industry is so critical that businesses are unable to expand their operating reserves and working capital, which frustrates their efforts to borrow and to arrange financing.

Laser entertainment strains the scientific aptitudes of these men because the krypton and argon-ion lasers which are the staple of the industry are very delicate and energy-inefficient. They can break down with a slight drop in water pressure and can use in a single show enough energy to light a mid-sized town for a week.

Laser entertainment will eventually reach "an enormous scale of mass appeal," according to Dick Sandhaus of Science Fiction Corporation of New York. But before that happens, the major laser manufacturers like Spectra Physics of Palo Alto, California, will have to develop more rugged lasers.

That is unlikely to happen in the near future, says Carl Schulthess, field sales engineer for Spectra. "Nobody is planning lasers designed for light shows," Schulthess says. "There's not enough demand." For now, light show companies will "just have to ride along on the coattails of the rest of the laser industry," says Schulthess, who warns that a company has to be able to confirm \$5



This past New Year's Eve, Harrah's Hotel in Reno used lasers to create an animated billboard.

PHOTO © 1980 LASER DISPLAYS INC.

million in sales over a two-year period before Spectra Physics will sell it lasers.

The safety factor of lasers is a problem also, though not for the expected reasons. The Bureau of Radiological Health (BRH) is the wing of the FDA which oversees laser light show safety. While the BRH closely monitors laser light shows to make sure that lasers are not shined directly into the eyes of the audience members, it revealed that despite notoriety to the contrary, no serious eye damage from lasers has been confirmed.

Writing in the *FDA Consumer* in September 1978, Annabel Hecht, staff writer with the FDA's Office of Public Affairs, reported that "... there have been rumors, but no confirmed reports as yet, of eye injuries suffered at laser light shows. Through a letter in a professional medical journal, the FDA is asking physicians to report any such injuries that come to their attention."

The BRH advised consumers to call their local health department if they are going to a laser show. They can find out whether safety checks have been made and local ordinances are being met. If the equipment and the operators do not meet the requirements they cannot perform. The danger is in the misdirection of the laser beam, not in the equipment itself.

Laser light show performances are a marriage of audio synthesizers and light synthesizers. These shows, which coordinate light and music, revolve around gas-filled laser tubes which amplify light much the way speakers amplify sound. But instead of amplifying electronic impulses, the laser works by exciting certain atoms in the gas inside the tube so that they emit light energy.

Laser operators, called laserists, work with very specialized equipment. Inside laser projectors, argon and/or krypton ion gas lasers are placed. In a gas laser, the gas is housed in a glass tube with a fully glazed mirror at one end and a partially glazed mirror at the other end. The atoms of the gas are fed with energy by a power supply.

The word "laser" is an acronym for Light Amplification by Stimulated Emission of Radiation. In plain language, that means you can save up bits of light (photons) from stimulated atoms and release them in an instant at a single wavelength in a single direction. The result is a zap of light that in a billionth of a second can equal twice the total electrical power capability of the United States.

To create their effects, laser light shows use straight quartz tubing a few feet long that is filled with either krypton or argon gas and sealed with electrodes just like a neon-sign tube. At both ends of the tube are mounted quartz windows. Two front surface mirrors are placed in front of the windows in precise alignment with the tubing. By applying a certain voltage between these electrodes, the operator is able to ionize the gas in the tube, which glows like a neon sign—only this sign is as bright as a welder's arc throughout the length of the tube.

When the gas atoms "excited" by the volt

Lasers for Holography

"Holography is three or four breakthroughs away from being commercially viable."

With those words an expert in the field of laser entertainment placed the arrival of holographic movies at the end of this decade. Dick Sandhaus, president of New York-based Science Faction Corporation, leads the company which leads the field in laser entertainment equipment sales. And Sandhaus says the era of correct-color three-dimensional entertainment through holography must await as yet undeveloped technology before science fiction becomes science fact.

Holography is an apparent three-dimensional imaging technique that utilizes laser light. A hologram is actually a photograph of the light waves that are reflected by a laser-illuminated object.

Unlike normal two-dimensional photographs, a hologram records all of the reflected rays of light that come from the original object. When illuminated by laser light, or even by white light in some instances, a hologram recreates the object in 3-D.

Viewed from different angles, the image looks so real it appears that you can almost touch it. That's because holographic images have the same size, dimensions, volume and space as the original object. However, color is another matter. Dichromatic discs which have the images on gelatin laminated between glass, and plastic rotating cylinder display units both are troubled by color problems characteristic of the holography manufacturing process.

The procedure for making holograms is

somewhat complicated. Basically, a laser beam is split in two by a mirror. One half of the beam shines directly on film. The other half strikes the object or person to be photographed and is then reflected onto the film. Later, when the piece of film is displayed in laser light, it creates a transparent three-dimensional image of the original object. In the case of reflective holograms, which are being used as belt buckles and pendants, only ambient light is necessary. Cylinders need be illuminated by only a 100 watt bulb.

Holography has a potential, but somewhat limited future in television. Holographic television receivers would work by reproducing the changing light-wave patterns that fall on a holographic television camera. The camera would pick up the interference patterns produced by a laser that illuminates both the scene and the optically sensitive surface of the camera.

These interference patterns would then be displayed by a variable transparency surface at the receiver. There are many ways to vary the transparency of special screens or thin films to display the dark, microscopic wavy lines of the interference patterns. When a second, identical laser is shown through a receiver screen, a good 3-D image is formed.

Though much design work on holographic television has been done, a working holographic television has never been built. Holography is a poor system to use for commercial TV, since you have to bounce lasers off subjects being photographed, so you can't get shots of football games and airplanes flying into the sunset.

of electricity return to their normal state, they emit a photon or photons. "Stimulated emission" occurs when an excited atom is stimulated to emit a photon at a particular time.

When stimulated emission takes place, a photon which has already been released passes near enough to an excited atom that the atom is stimulated to emit another photon, which is not only the same wavelength but is now traveling exactly side by side with the original photon.

As these photons bounce back and forth between the mirrors in the tube, some of them begin to leak out through the partially glazed mirror. The result is a coherent beam of light which spreads out very little over a distance.

The beam is then directed into a multitude of optical components in the projector: mirrors, prisms, and other light bending elements, some of which are mounted on actuators and scanners. Beams emanate out of the projector and are directed onto screens, domes, ceilings or other relay optics (like bounce mirrors) which are positioned strategically over the stage area and above the audience. Bounce mirrors enable one laser and

one beam to create a "matrix" of light that looks as though a dozen lasers are at work.

The laser scanning projector is a series of electronic and electro-mechanical modules custom-designed and modularly connected through a central control board/console and an audio switching system. It enables a laserist to create an innumerable array of moving multicolored designs and patterns which are perfectly synchronized to music.

These designs fall generally into two categories: *scanned* images, which are created by rapidly moving a point of laser light to make simple or complex geometric shapes like those seen on oscilloscopes, or *diffused* images.

To create scanned images the laser unit is aimed into an X-Y scanning mechanism that directs the beam to move simultaneously in both horizontal and vertical directions. The egg-shaped mandala-like images are known as lissajous patterns.

Diffused images are created when a laser beam is reflected from or passed through certain kinds of optical surfaces which spread out the light. These can take the form of in-

(continued on page 67)

SuperNews Takes Off

Is there something missing from your daily dose of TV news? Do you wonder if there's anything more behind a one-sentence story uttered by Walter Cronkite? Do you ever crave to know the world situation at three o'clock in the morning? Do you search in vain through 25 channels of cable television for something more than hockey games and reruns of *Leave It To Beaver*?

But wait, up in the sky! From a satellite 22,000 miles high—it's SuperNews! Light news, heavy news, science news, financial news, breaking news...all news, and 24 hours a day.

SuperNews comes to the rescue of three million cable TV subscribers on June 1. Cable News Network (CNN) or SuperNews, as it has been dubbed, is the first to take on the networks in the area of news broadcasting and it has done so in a very big way.

Using a Satcom satellite in synchronous orbit around Earth, Ted Turner, the flamboyant entrepreneur and sportsman, plans to

vision camera. It took seven hours before a viewer noticed and called the studio.

However in 1975, RCA launched Satcom 1, a solar-powered satellite that floats in stationary orbit 22,000 miles over the Pacific. Suddenly the cable boom was on. The combination of cable systems capable of carrying 36 to 52 channels, the satellite, and Earth stations (parabolic dish antennas) scattered across the country shot new life into the cable industry, spawning movie channels like HBO and all-sports networks.

Ted Turner was one of the first to catch on to the possibilities and turned his local Atlanta cable station, WTCG, into a "superstation." He did it by beaming the UHF station to the Satcom satellite which in turn beamed the signal back to Earth stations linked to various cable systems. Turner's idea has been successful. Four other UHF stations in New York, Chicago, Los Angeles and Oakland quickly followed suit and became "superstations."

tional advertising—ten minutes an hour. Bristol-Myers, one of the first advertisers on radio and television, has already plunked down \$25 million for a ten-year sponsorship of a health-science news program that will run daily.

Executives of CNN say the format of the all-news station will be similar to that of all-news radio stations: "soft" features interspersed with regular news summaries. About 30 percent of the material will be repeated in cycles, most of it between midnight and 6 a.m. A two-hour news package will be offered from 8 to 10 p.m. and is designed to compete with the networks' prime time entertainment.

Former CBS White House correspondent Daniel Schorr has been signed on as anchorman in CNN's Washington bureau. Former New York Congresswoman Bella Abzug, political commentator Richard Reeves, columnists Roland Evans and Robert Novak, former Secretary of the Treasury William Simon and others will make regular contributions. William MacPhail, formerly of CBS, will run the daily 30-minute all-sports review as well as round-the-clock sports recaps. CNN also plans to meet its network competitors head on at the Republican Presidential Convention.

"We don't think giving us 24 hours is a mandate to be boring," said Ted Kavanau, a CNN executive, in an interview with *Broadcasting* magazine. He said CNN will "maintain proper standards" of journalism with "the average good story" running two-and-a-half to three minutes. CNN, he said, plans to cover a continuing story in blocks, looking at it from different points of view. A major story might get a total of 10 or 12 minutes of attention in an hour. Executives concede that CNN will have a difficult, if not impossible task, taking viewers away from network news. But, they say, CNN is not competing for the Walter Cronkite regulars; rather the individual who would rather watch news than, say, *Vegas*.

An advantage of the 24-hour format will be the ability of CNN to go live whenever a major story is breaking. For the networks, going live means busting into an entertainment program, angering viewers and losing money from sponsors when commercials are cut. Another advantage of the format will be the ability to air "secondary" stories, such as lifestyle subjects that probably wouldn't make it during a network's national half-hour broadcast.

In an interview with the *Washington Journalism Review*, Schorr was asked what attracted him to a 24-hour news operation. "It's live everywhere all the time, so there are no time-delay problems. And it's open-ended—you don't have to beg the business side to

SuperNews is a \$100 million gamble that pits 24-hour news against the entertainment offerings of the three national networks. An advantage of the 24-hour format will be its ability to go "live" whenever a major story is breaking anywhere.

broadcast a round-the-clock television news program to information-hungry cable TV watchers in 36 states.

"The polls show that less than half the people depend on the newspapers for their news," Turner said in a recent interview. "The majority of people now depend on TV for their basic news and I don't think they're getting a straight story."

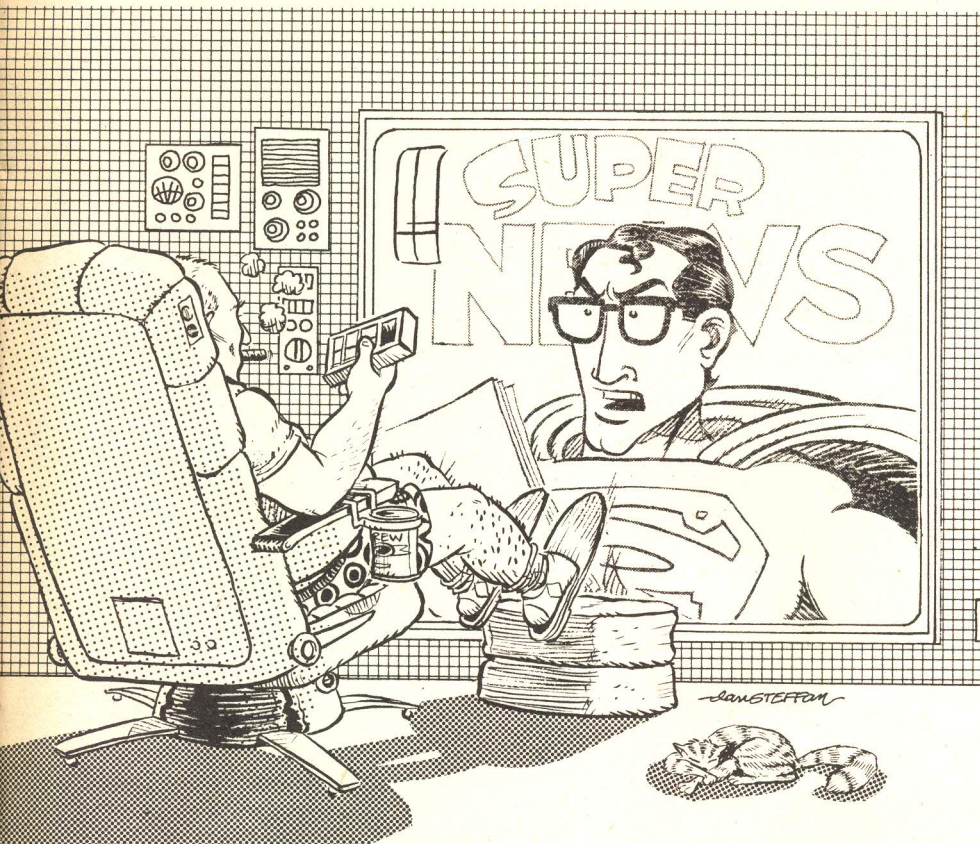
Whether or not people want more exhaustive coverage of the news remains to be seen. But whatever the outcome of Turner's latest enterprise, he has already delivered on some of the promises made a decade ago by proponents of cable television who proclaimed cable would revolutionize communications and turn homes into information banks.

That revolution has been a long time coming. Cable TV, which was first introduced in 1949 in rural Pennsylvania to improve reception for farmers, dawdled along for years by offering stock tickertapes, temperature dials or worse—talk shows hosted by an array of bizarre individuals with little to say. The popularity of local cable programming became embarrassingly apparent in 1971 when someone broke into a cable television station in Beverly, Ohio, and pasted photos of nude women over the time and temperature dials which were automatically scanned by a tele-

SuperNews is perhaps the next logical step. It is a \$100 million gamble that pits 24-hour news against the entertainment offerings of the three national networks. It has bureaus stationed in major cities around the country and plans at least three foreign bureaus in London, Asia and the Mideast. Reporters, editors, producers and production teams were culled from a number of commercial stations and CNN's technology is said to be the finest.

The bureaus will feed reports to headquarters in Atlanta which will beam the signal to the satellite. The satellite's transponders will then return the signal to Earth stations which are linked to cable companies. CNN had 240 cable systems signed up for the news service by the end of last year. Those companies broadcast into the homes of three million people. Cable has saturated nearly 30 percent of all homes in the United States, according to industry sources.

For a cable operator who already subscribes to WTCG's satellite service, CNN will charge 15 cents a month for each subscriber. Other operators will pay 20 cents a month. These charges are for operators who want to offer the news channel as part of their basic service, which subscribers get as a monthly package for a flat fee. CNN will also sell na-



preempt entertainment programming to cover breaking news.”

Schorr said he reached perhaps 100 million people on the network news, “a lot of whom were only waiting for the next entertainment program to begin. In cable I will reach maybe five million people but they will be a self-selected audience who are watching because they want to see the news and are paying attention.”

Reese Schonfeld, president of CNN, said, “There just has to be a way to present news outside of an entertainment structure. In the world’s most powerful and most important nation today you shouldn’t have to do a day of garbage to support news.”

Some industry observers consider Turner’s network a success before it begins because it stands to be carried by most of the present cable systems and virtually all future ones and will have no competition for the near future. Others say CNN’s success is far from assured and network executives so far have pooh-poohed the ability of cable to significantly alter the networks’ domination over viewers. While proponents cite the success of all-news radio, critics say the comparison is limited since people listen to the radio (in the car for instance) and do not have to watch it.

Technological foul-ups have put a crimp in Ted Turner’s plans before and there’s no telling when they will again. SuperNews was originally scheduled to air in January 1980, but among other things, the RCA Satcom 3 satellite CNN planned to use got lost in space. Six companies, including CNN, had planned

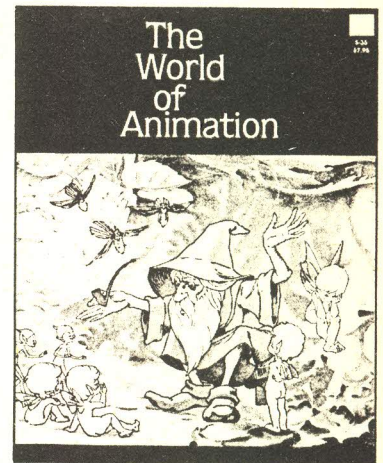
to use transponders on that satellite. Two transponders were available on Satcom 1 and Turner had to go to court to force RCA to let CNN use them. There were charges that RCA, which owns NBC, was trying to protect its network from CNN.

Turner has remained undaunted, however, and a recent CNN newsletter cites three recent polls that show Americans are looking for more news. A survey conducted by the National Cable Television Association in 15 major cities reported that 36 percent of all television viewers would like to see more news and information. Another conducted by R. H. Buskin and Associates showed that 45 percent of the respondents would rather watch a television news program than an entertainment program broadcast at the same time. A third survey cited, conducted by Viacom in Napa, California, showed that 78 percent of the respondents preferred news programming to any other programming offered.

“Cable,” Turner told the Washington Journalism Review, “is the new technology that nobody can ignore. Aren’t 30 channels better than three or four? . . . We’re increasing people’s options and people want more options. What kind of a world would it be with only three magazines?”

If CNN is a success, there’s no doubt that Turner will turn his hand to other cable projects—if he hasn’t already. When asked what else Turner had up his sleeve, a spokeswoman for CNN put it this way: “I really couldn’t comment on that. All I can say is that Ted Turner is an innovator and an enterpriser.”

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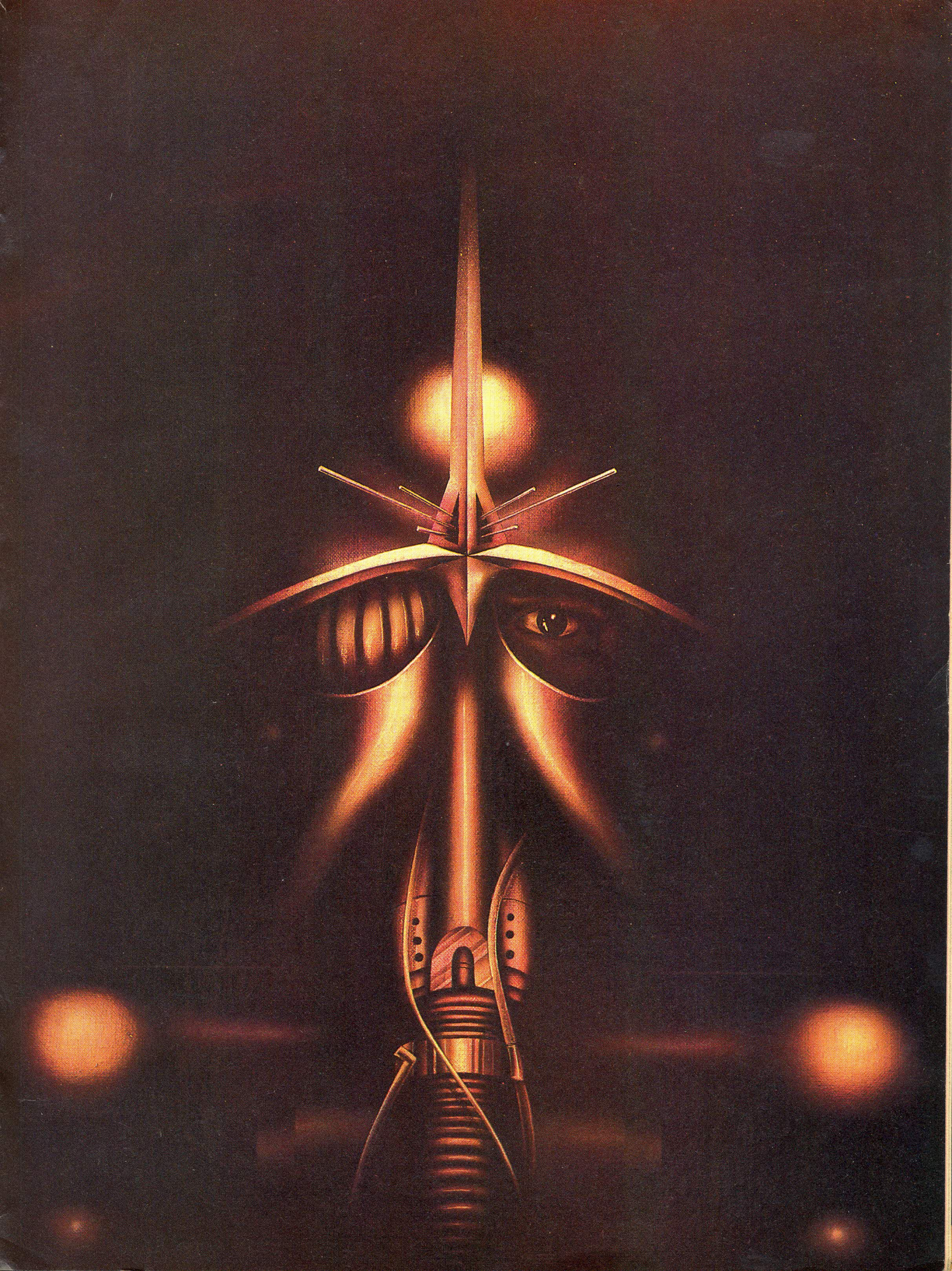
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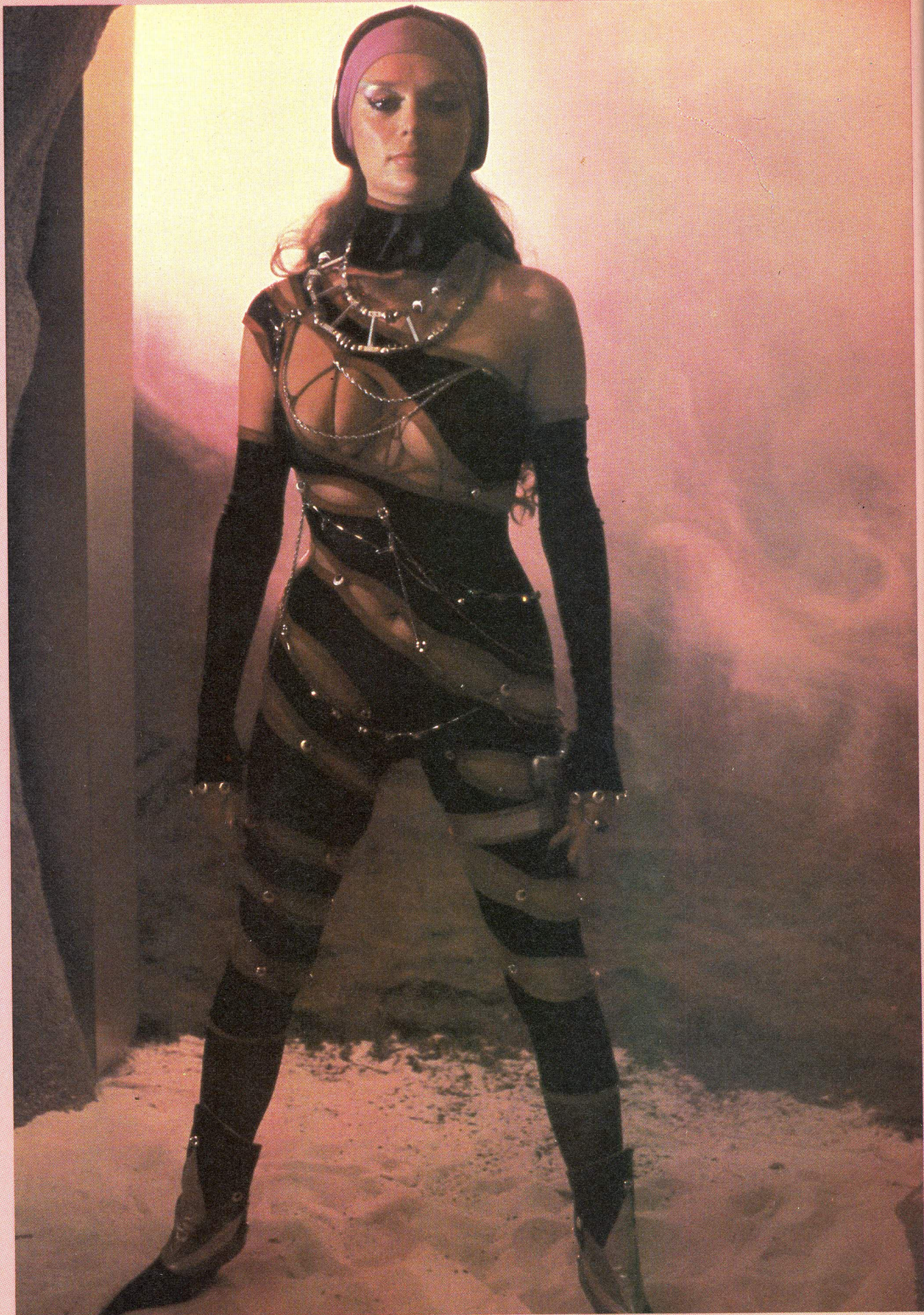
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We
Are
The
Reliquaries
Of
Lost
Time

By RAY
BRADBURY

We are the reliquaries of lost Time;
Until our age, the rage to know, collect,
And try at saving everything our eye could touch
Or hand could shape, was raped
By violence of rushing years—
The winds that blew and took our sense,
The rivers on their way to seas
Which swept all fact away
And left us with a coinless bank and empty hands
In storms that blew hot sands abrading wits
So we lost all; not only chaff
But kernels sweet with reckonings of place and hour and myth.
Our tongues were feeble, yet spoke truths
And passed them on as best we could at fires.
Desires and dreams hid in the mouths of few
Who traveled telling tales down history.
The same tale varies
With the telling of these nomad reliquaries . . .
But they were all we had!
Until a clay cuneiform took catprints from our paws
Which could be read on shores long after tides of men
Died off and left the wreckage of their nightmares
And their architectural graves.
All this we know, have said.
Because of it, most of the Past lies dead.
But us? Now, us?
What do we do that's special-fine?
The wines, the vintages of Time we store away
As apothecary and thus saviour of the nations
And the nations blueprintings
Of their elder shadows and their childrens' bright noon suns.
We've won.
That's simply put, yes, right? Right. Simply put.
We've won.
For look and comprehend:
We **are** the Reliquaries of **All** Time!
Where saints sweet bones were once collected
And put up in crystal cannisters with golden lids,
We hide a better stuff. Not bones, not skulls,
Integuments of archangelic flesh, not Pontiff mummified -
Old John Paul powdered to a snuff against the age.
We beg from Time and keep it all, yes, all,
And once again, now hear it: All!
Machineries now keep what once
Was gone and lost away forever in a sleep
From which no beckoning could bring
So much as one bright word, one monarch's myth,
One child's plaything.
We better that.
We chuck and toss and tape and data-ratify
Our world into electric hats [six? seven and one half?]
[large? small?]
Which others wear ten thousand years from now and stand the
Tall.





PHOTOS: © 1980 NEW WORLD PICTURES

BATTLING TIME AND SPACE

A movie crew concocts major miracles on a minor budget.

By ED NAHA

On the planet Akir, every cloud does not have a silver lining. In fact, the only thing lurking in the haze above this backward alien world is a fleet of war ships commanded by intergalactic goon Sador. Sador plans on adding the planet to his list of conquered territories. However, young Shad, citizen of Akir, has other plans. Fleeing his homeland in a well-worn spaceship named *Nell*, he journeys through deep space in an attempt to raise a mercenary army capable of defending his homeland. It ain't easy.

That, in a nutshell, is the plot of New World Pictures' forthcoming outer space epic *Battle Beyond the Stars*. Produced by Roger Corman and directed by Jimmy T. Murakami, this science fiction glorification of *The Magnificent Seven* is proving a challenge not only for Shad and his army of Akirans but to the technicians and effects experts assigned to the movie as well. "Basically," says art director Jim Cameron, "we're trying to create a film that is as visually impressive as, let's say, *Star Trek*, but with something like one tenth the budget. It's been pretty hairy at times."

The \$6 million opus has shaped up to be a hellzapoppin' affair for all concerned. While director Murakami busily shuttled actors Richard Thomas, Robert Vaughn, George Peppard, Marta Christen, John Saxon and Sybil Danning around for the six week shooting schedule, Cameron and crew found themselves battling to keep the sets arriving on time. Various production delays and accelerations somehow brought construction and production together fairly unexpectedly and, at times, the directors and actors wound up filming the space opera on spaceships that were still being built!

"I suppose you could say that we've all been working in an atmosphere of jovial desperation," says Cameron with characteristic good cheer. "We're all very excited about this movie. It has a great script and a lot of wonderful effects but the time schedule has been a real gun-to-the-forehead experience. Basically, we're working from set to set as the film progresses. We eventually got our swing set organized so we could build sets a little ahead of time, but for a while it was totally nuts. We'd build a set and strike it, build a set and strike it."

Jan Ferris, one of the film's chief

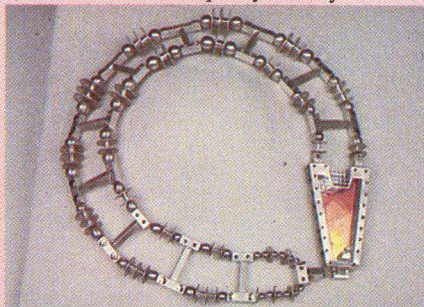
designers, elaborates. "This is Roger Corman's first big budgeted science fiction film and the problems that showed up weren't all foreseen. We had to create a totally new environment on a pretty harsh shooting schedule. We worked around the clock on this one. Some people were actually sleeping on the sets. You'd walk into a cubbyhole in a spaceship and there would be this person sleeping there that you'd never seen before. The company eventually rented some hotel rooms nearby so we could all take naps between periods of work."

Cameron admits that the slapstick scheduling caused a few production problems but insists, "In terms of aesthetics we really haven't had to sacrifice all that much. We've had to sacrifice a bit in terms of super close-up quality but we worked pretty closely with our

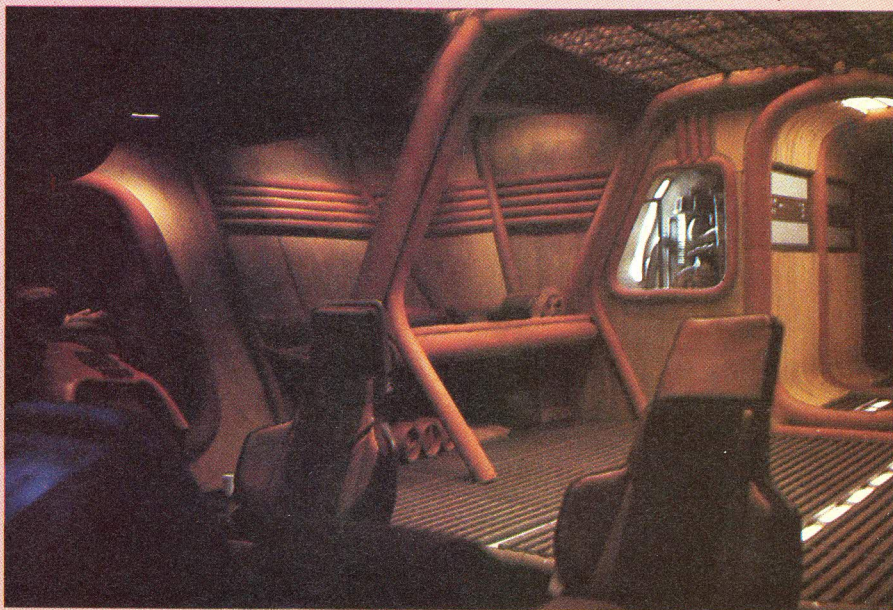
director of photography and our gaffer. We'd figure out ahead of time how we'd want to shoot the stuff and that helped a lot. It allowed us to build less and build it well as opposed to building everything for possible shooting like they did in *Alien*. We built sets specifically for the shots we were going to use."

As well as facing a seemingly impossible time framework, the New World cadre had to surmount a goodly number of creative hurdles as well. "The movie was a really tough assignment," says Cameron. "What we had to do was capture the sense of each alien culture and represent it in the set. There are eight or so societies to consider. We tried to reflect each of the characters in their spaceships as well. Shad's ship, *Nell*, reflects

(continued on page 53)



Left: Designing this ever-changing jewelry was a challenge for sculptor Jan Ferris. Opposite page: Finding the ever-changing jewelry on actress Sybil Danning as Saint Exmin is a challenge for moviegoers. Below: The interior set for spaceship *Nell* under construction. The entire creative staff of *Battle Beyond the Stars* worked 24-hour shifts in order to create an epic fantasy on a less than epic budget. At one point, crewmembers were actually napping in the spaceships' cubbyholes.





GARY



NUMAN

His unique musical vision of the future is machine-dominated, paranoid and eerie. And those are the good parts. By LOU STATHIS

Ask a typical American record buyer what the name Gary Numan means to him/her, and chances are you'll get a blank look for an answer. While Numan is a virtual unknown in the U.S.A., he was Great Britain's rock success story of 1979. His singles "Are 'Friends' Electric?" and "Cars" were both number one on the U.K. charts for extended periods, while

the albums *Replicas* and *The Pleasure Principle* each in turn monopolized the top LP slot and followed it with a criminally near-permanent stay in the top ten.

Numan's success, if not overnight, has certainly been meteoric. Two years ago his name was known to no one—not even himself. At that time, while still a teenager, he played in an unremarkable band called Tubeway Army and used the nom de rock "Valerian" (after a French SF comic hero). The band released

two singles in the winter of 1977-78, "That's Too Bad" and "Bombers," a pair of straightforward hard-rockers that, as was the fashion, relied heavily on Valerian's wall-of-sound, power-chorded guitar. The records went nowhere, as did the band, and they promptly dissolved. In August of that year, Valerian changed his name to Numan, and with the assistance of Army-men Jess Lidyard (drummer, and Numan's uncle as well) and Paul Gardiner (bass), recorded some songs he had been writing. Though never intended for release, the result was issued shortly thereafter by Numan/Tubeway Army's record company, Beggars Banquet, as *Tubeway Army* (though essentially it was Numan's first solo album). Musically, the LP was still limited by its traditional rock trio format, but as the song lyrics clearly indicate, Numan's bleak vision of a paranoid, machine-dominated future was beginning to take shape.

This vision, fed by Numan's prodigious reading of William Burroughs and Philip K. Dick, reached its first stage of maturity with the April, 1979 release of *Replicas*, Numan's second album. Gary himself feels that the change measured by the two LPs was a natural one. He says, "I was getting fed up with guitars; going through the Punk thing and realizing it wasn't going anywhere. It wasn't changing at all, and I just couldn't write songs on the guitar anymore—it was boring. I realized that there was nothing you could do that hadn't gone before."

In the fall of '78 two things happened to change Gary Numan's musical outlook—first, he acquired a synthesizer, and second, he discovered Ultravox, a seminal important group of avant-rock hybridizers. Numan discovered, while teaching himself to play his



PHOTO: © 1980 ATCO RECORDS

Left: Numan feels a chill onstage. Above: Bless its pointy little head.

newly-acquired instrument, what a truly limitless potential the machine possessed. "I became aware of the depths you could get," he remembers. "The changes you could put them through—it's like a dozen instruments rolled into one. Synths have far more feeling than guitars. They are probably the most human of all machines, as variable as humans—different every time you play them." Numan willingly acknowledges the debt he owes Ultravox for their exploration of new avenues of expression. As he describes it, "Ultravox influenced me to use synths not as a squiggly noise or rhythm instrument, but for atmospheric effect and for putting a whole new rhythm into a rock song—sort of taking the place of the rhythm guitar." On *Replicas* Numan uses the synthesizer to add depth and texture to his science-fictional vision—giving "Down In The Park" an unmistakable air of eerie malevolence, and songs like "Replicas," "Are 'Friends' Electric?" and "Me, I Disconnect From You" the feeling of hopelessness and melancholy that pervades much of his work.

Replicas, as originally conceived, was to have been a collection of short stories exploring Numan's vision of a near-future England, a world that mixes *A Clockwork Orange's* random violence, the despair and furtiveness of Burrough's junkie underworld, and the paranoid struggle for humanity contained in most of Dick's novels. "I suppose it's a bit bleak," Numan admits. Tentatively titled *Praying To The Aliens*, the book told the story of a time, "in ten or 20 years when the government creates a machine that makes all decisions—like a dictator—but the people aren't told of its existence. The machine decides that the only thing holding back the State is the people themselves, so a quota test is staged under the pretense that if you weren't up to quota-standard, you would be taken away and re-educated. In fact, you were simply gotten rid of. The people sitting the test are the 'Crazies,' the people who set it are the 'Grey Men,' and those collecting the ones who've failed are called 'Machmen.'" The cover of *Replicas* has Numan dressed as a Machman—black uniform, bleached hair, pale lifeless skin—staring at the reflection of a 'friend' in the window ('friends' are mechanized companions). The idea for this nightmarish image of repressive authority came from an old war book Numan remembers seeing as a child. "There was this picture of an SS man, wearing all black, just standing—his eyes bloodless and staring. It struck me as the perfect vision of terror."

Many of the songs on *Replicas* have meaning on at least two levels—one, as part of Numan's SF scenario, and also as personal statements on present-day reality. Songs like "Me, I Disconnect From You," and "Are 'Friends' Electric?" are touching, plaintive stories about the pain of feeling in a cold, depersonalized world. "Friends' is about complete alienation behind a facade of normality. It's about not having real friends anymore, where you ring up a 'friends' agency and they send 'round a mechanical sort of friend—something that's devoid of problems

and any real feeling." He adds, by way of comment, "People don't really talk to each other or make real friends any more. I wrote the song because I lost friends when I was younger; I didn't lose them so much as them getting rid of me. It bothered me quite a bit."

Obviously, this young man feels alienated from, and apparently fearful of, the rest of humanity. He describes himself as an "over-the-top paranoid," and professes a distrust of crowds. "There are some days when I just can't go out and walk down the street. I don't like being in crowds where you're so close to people that, if anything happens, you can't get away. I like to see who's near me, so I can look at them and decide whether they're going to do anything or not." From this fear grew "Cars," Numan's second number one single and probably the best song he's recorded. "Cars" is about feeling safe—being protected by metal, by a big engine, locked doors, seat belts, etc." Numan's statements betray a marked ambivalence in his feelings toward technology, seeming at the same time fearful of it and looking to it for protection



and as a sort of role model. "I've always seen machines as being powerful and cold—and for me, the only way to be successful is to be cold. I don't think I'd enjoy being that way, but . . ." He leaves the thought unfinished. "I don't really think machines threaten us the way most people think. They won't have to take over our lives because we're getting rid of ourselves. Machines have given us more leisure time, and because of this people are reverting to their primal instincts—that is, being violent."

The release of *The Pleasure Principle* came in September '79, when "Cars" was the U.K.'s reigning single. One week after the LP hit the stores, it too was holding court from the top. Musically the album is a complete step beyond *Replicas*—more confident, mature and refined. All guitars have gone, and reliance on synthesizers is almost complete. The songs are still structured traditionally, leaning heavily on the driving rock-rhythm foundation and the simple melodic interplay of the synthesizers. The sound is clean and efficient, almost spartan; mesmerizing, but never mechanical. Again, despite the looming specter of loss and hurt, the songs make superior pop music.

On the heels of *The Pleasure Principle* came Numan's first major world tour—his first live appearance since the early Tubeway Army days and the first time he would appear in the U.S.A. and the Far East. The show's scale and spectacle reflected Numan's desire to create larger-than-life images with a striking, visually stimulating performance (in the

tradition of Pink Floyd and David Bowie). His studied stage presence, and the role-playing he adopts like a protective mask, reinforce the feeling that Numan wishes to keep the audience at arm's distance. He concurs, but sees it more as a necessary part of the illusion he is enacting for the audience. "As far as I'm concerned it's show business. You put on a show, you dress up, create characters in your songs, you look like the characters you're creating in order to portray them, so that people can understand the songs better. I don't see the point in singing about things which are happening every day. I don't want to go out and listen to a bloke prattling on about how terrible it is living on the dole. I'd rather go and see somebody on stage with big high towers and little robots moving about, than somebody in jeans and an old mac in the back of a pub."

The stage-setting that accompanied Numan around the world did indeed feature the aforementioned high towers (which served as dual keyboard command posts for band members) and scurrying, diminutive pyramids. The robot, due to the limited stage space available, never made it out of the crate. Numan emerged at the show's beginning from the darkness, standing amidst a swirling mist, outlined by a luminous wedge of light directed at him from the huge towers. Watching him stalk the stage with studied grace, you can't help but wonder about the rumors that Numan was actually cloned from accidentally irradiated Bowie cell-matter, or that he is a simulacrum constructed in some underground automated factory. His deep-set eyes and pale-skinned face call up the image of Klaus Kinski as Dracula in Herzog's *Nosferatu*. The two share a predatory, ambisexual aura; a chillingly feral, prowling presence that is positively unnerving. Numan shows little emotion on stage—when he smiles his lips pull back toward his ears while an inhuman, anthropophagus glint ignites in his eyes (a bit like Godzilla readying to stomp Tokyo into the ground).

The key to Numan's success is his facility to synthesize the ideas of others into compelling, memorable popular music. His talent is in manipulating symbols and concepts, exploiting the resonance they produce with all the technology available to him as a modern artist, and producing a visual, aural and visceral entertainment. He will eagerly point out his sources of inspiration for you, and self-deprecatingly calls his method of creation "parasitical." He says, "I take phrases that I like out of books and such, twist them until they are unrecognizable and then write songs with them." He uses the accessibility of the rock song the way a science fiction writer uses a strong, involving story-line. The result in both cases feeds your mind and body simultaneously. Numan claims he is not long for the music business. He expresses interest in writing SF stories, and says he is studying to obtain his pilot's license. "I really love to fly," he tells you with a grin. His goals? "I've always wanted to be famous and rich, but I wanted to do something that would make it worthwhile to get there."

Battling

(continued from page 49)

the lifestyle of the Akirans, which is very organic. The *Hammerhead* and the Malamori fighters, which are the bad guys' ships, have this heavy, structural, almost purposely non-aesthetic quality which we refer to as 'high tack.' Saint Exmin's ship (she's an Amazon-like warrior woman) is a very curvaceous, Freudian sort of thing. We've tried to give the movie a very distinctive look and I really feel that we've succeeded."

Stepping in for original art director Charles Breen after production had already begun, Cameron faced the problem of creating and building spaceships while the actors were actually roaming about the New World stages. "That was a really funny experience," he deadpans, "but the actors didn't seem to be all that put out by it. In fact, they were very helpful in the designing of the ships for their characters. Richard Thomas in particular seemed to enjoy the idea of having his vessel designed and built for him. He gave us a lot of input and we did everything in our power to give him the sort of things onboard that he'd like to react with.

"George Peppard seemed to enjoy his ship, too. It has things like a wet bar that pulls down from overhead. Robert Vaughn's ship is my favorite. His character is that of a very rich space mercenary. I figured that his ship would be completely customized; hand-made to fit him like a glove. The catchwords we used to cue everybody who was working on it was 'space Maserati.' The interior surface is very slick, stylized and glossy, picking up a lot of reflection. His costume is black so the ship's bridge is basically high gloss black.

"For the most part, the entire film went smoothly. We were only late with a set once. What we did was this: We alerted the director that the entire set wouldn't be finished in time so we completed a single section of it in detail. They then filmed in the finished section and, nearby, we were quietly working away on the rest of it. We actually managed to pull it off without going off schedule. This movie has been a strategical and logistical challenge as well as an artistic one."

As in many of Roger Corman's past efforts, the key factor in the making of *Battle Beyond the Stars* has been the unbridled creativity-under-fire conjured up by his crew of young and enthusiastic professionals. In for the well-choreographed chaos this time around was Jan Ferris, who worked on jewelry, props and interior designs. To give the movie's jewelry that "tomorrow" feel, the young artist came up with an idea that was truly futuristic.

"The process I used for creating the pieces," she says, "is something I developed while doing graduate work at Florida State University. Each piece consists of several cells made out of laminated plexiglass; very clear, very slick. In between each sheet there is mercury flowing through fluid that has been tinted with different colors. The cells are stacked on top of each other so, when one

color overlaps the other, you have different color schemes appearing. It's very high tech.

"In the finished movie, you'll see the characters wearing these pieces of jewelry that are ever-changing, ever-moving. Sybil Banning wears a large piece around her neck. There's a triangular shape which joins the collar and it's this triangular section that houses the plexiglass cell. You can see the mercury running through with two different colors of peach within."

Jan's talent for body sculpture led her to serve in yet another capacity during the filming. "Sybil plays the woman warrior Saint Exmin. Since she wears such a prominent collar, they thought it would be a good idea to tie in the interior of her spaceship with the style of her jewelry. So I wound up working a lot on the interior details on her ship.

Amazingly enough, at the end of six weeks, the principal photography, replete with spacey sets and physical effects, was completed. At present, director Murakami and producer Corman are putting the finishing

touches on the final print to be released in some regions of the country in July. Corman's plan is to spread the film around from city to city, state to state, over a three-month period of time; allowing science fiction buffs around the country to see his most grandiose exercise in space swashbuckling to date in their local theaters. And somehow, the neighborhood theater seems *exactly* the right place to view *Battle Beyond the Stars*.

"Sure, it's a big, sprawling movie," Jim Cameron readily concedes, "but working on it like we did created a sort of team spirit feeling that made it seem very personal to us. And if you take out some of the spacier elements you have a story about ordinary people."

No matter that the film won't be able to boast the same megabuck budget as *Star Trek* or *The Black Hole*; everyone connected with the movie insists that it has a lot of "heart." Maybe *Battle Beyond the Stars* is a harbinger of the next big wave in science fiction cinema: the homegrown epic made by and featuring jus' plain folks.

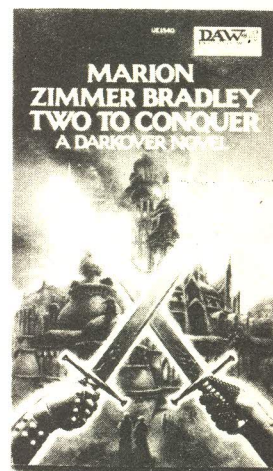
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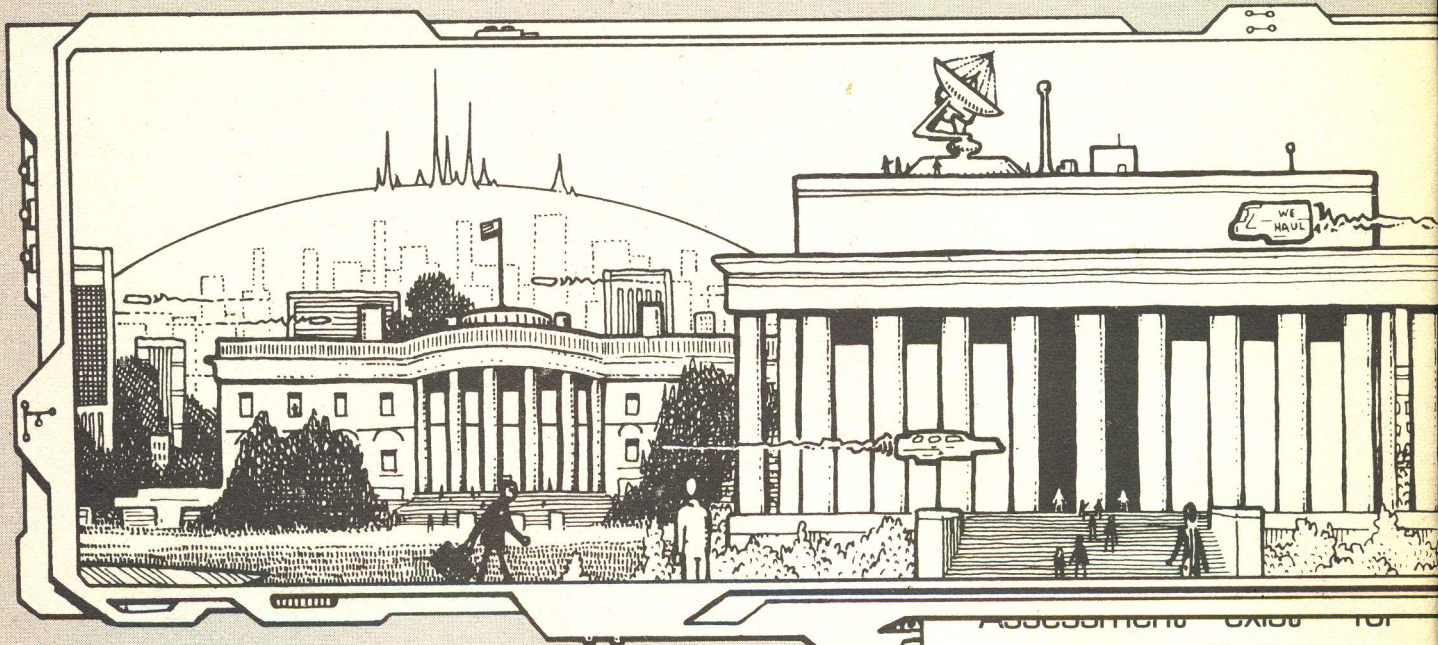
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CONGRESS LOOK



CONGRESSIONAL CLEARINGHOUSE ON THE FUTURE

By ALLAN MAURER

It never made the headlines, but in April, 1978, a large number of U.S. Representatives, Senators and their staffers "haruspicated with science fiction."

HarWHATSpicated?

Haruspication isn't an unnatural act and wouldn't interest the FBI, but in its original sense, it *is* messy. The word derives from the name for ancient Roman sages who predicted the future by looking at the entrails of sacrificial animals.

Using the word to mean "prophesy," George Chatham, a space research policy specialist, asked legislators to "haruspicate" with such science fiction writers as Hal Clement, Poul Anderson and Ray Bradbury, at a meeting sponsored by the Congressional Clearinghouse on the Future. Following Chatham's discussion of science fiction prophesy, Isaac Asimov told the Congressmen, "If science fiction is a literature of escape, it escapes to reality."

Exposing Congressmen and their staffs to the thoughts of science fiction writers and futurists is only one of many innovative activities the Clearinghouse on the Future has sponsored since its inception in 1976. Founded by Rep. Charles Rose, a North Carolina Democrat, it is an unofficial caucus of Senators and Representatives.

"It all started," says Clearinghouse director Ann Cheatham, "in 1975 when Charly was invited to speak to the World Future Society." At the time, Cheatham, a former school teacher, was a speechwriter for Rose. Alvin Toffler, author of *Future Shock*, was also on the bill that day, and convinced her "that citizens have to deal with the future or be overwhelmed by it."

Seeing a need to create more "futures awareness" in Congress, and "get more citizens involved in decision-making," Cheatham says, "I asked Charly if he would pay my salary while I nosed around." Rose agreed, but asked her, "How are we going to convince 435 members of the House that Toffler is right?"

"We won't have to," Cheatham said. "The people will convince them. There's going to be a massive turnover in this institution." That was 1975. "In 1976, it happened," she says.

Rose, one of those graying, craggy-faced Southern Congressmen who *looks* like a Congressman, does not fit many other stereotypes of the breed. Chairman of a computer policy committee, he wants to apply computer technology to "make Congress more efficient," and quotes Isaac Asimov on

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the purpose of helping the nation's lawmakers keep the future in mind.

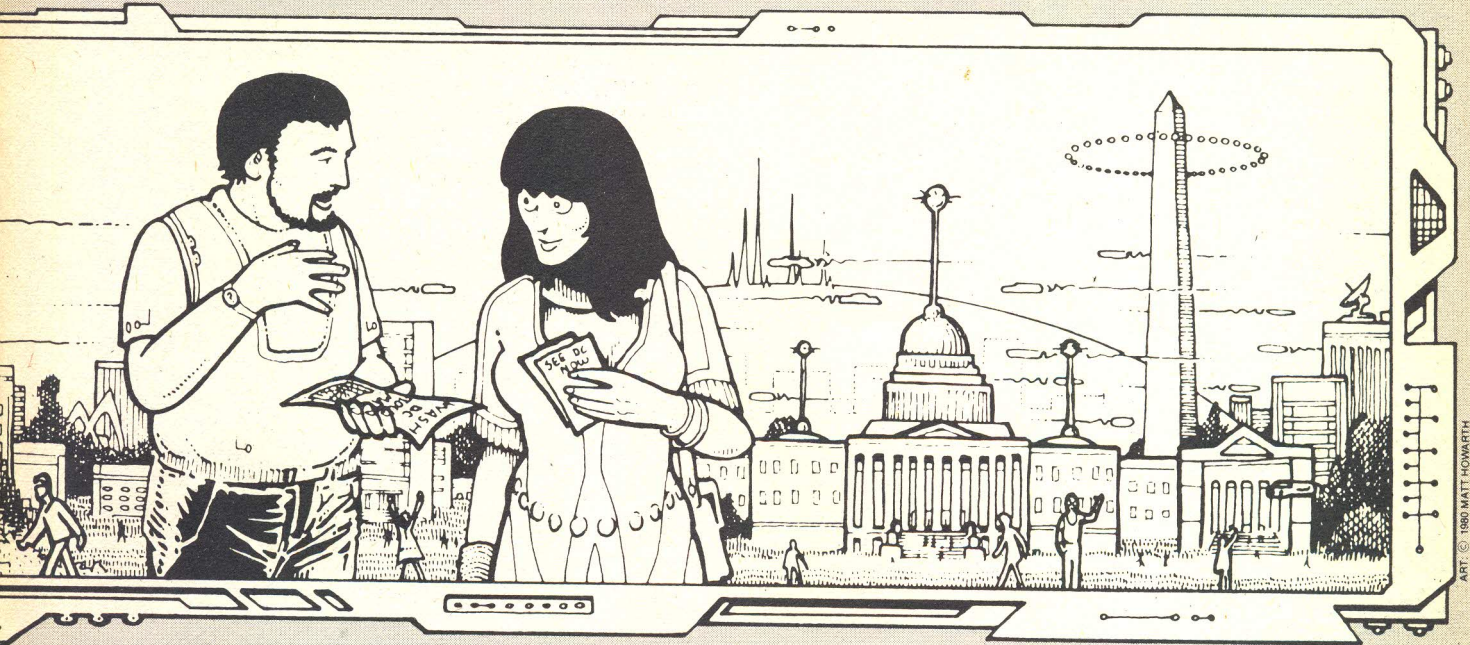
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Washington's crystal ball usually clouds up beyond the next election, but Congress is beginning to see the necessity of considering the future impact of present-day legislation. Two arms of government—Congressional Clearinghouse on the Future and the Office of Technology Assessment—exist for the purpose of helping the nation's lawmakers keep the future in mind.

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Washington's crystal ball usually clouds up beyond the next election, but Congress is beginning to see

S TO THE FUTURE



OFFICE OF TECHNOLOGY ASSESSMENT

By JULIAN M. WEISS

While most activities of Congress are concerned with a myriad of fragmented, short-range ventures, one arm of the national legislature attempts to grapple comprehensive features of the future. This agency, the Office of Technology Assessment, keeps a watchful eye on the fantastic, seemingly improbable shifts that alter eras and environments. The record for OTA shows mixed results, yet its high-powered thrust towards the next century is certain to intensify debate on scientific advances—unveiling new sets of issues before the Washington whirligig.

Origins of the Office can be traced to an October 1966 report by the Science and Astronautics Committee of the House of Representatives. Urging an "early warning system" on effects of technological changes for the Congress, the phrase "technology assessment" was thus launched. A few months later, the ball was passed to Emilio Daddario, Connecticut Democrat in the lower chamber. H.R. 6698 was a resolution asking for creation of a separate board to review the fast pace of scientific and technological advances. At first there was apprehension, since some feared that conflicts would arise over domain already held by such staunch Washington landmarks as Library of

Congress or General Accounting Office, both of which are capable of performing somewhat similar research. It wasn't until six years after the Science and Astronautics document that a Technology Assessment Act was passed. "As technology continues to change and expand rapidly," the legislation admonished, "its applications are large and growing in scale; and increasingly extensive, pervasive, and critical in their impact. . . ." So that consequences of the "technical applications be anticipated, understood, and considered in determination of public policy on existing and emerging national problems," OTA was set into motion.

Now in its eighth year, the Office is at a crossroads. A new director took up the reins last summer, and will steer OTA either ahead of lawmakers' thinking or at a pace only a few laps in front of immediate concern. The theory behind this outfit is simple: If legislators are aware of technological transformations, they will be better equipped to judge laws or regulations. As we will see, the scope of the Office's review is broad. Future uses of autos, global food supplies, mass communication and prospects for space stations are fair game.

Many see the Office as tied down to Earthly planes, and kept at bay from cosmic research

quests largely because of its client relationship with Congress. Realistically, HEW has a bigger practical constituency than OTA when pressure groups (and votes) are tallied. OTA director Jack Gibbons is not dismayed. "More people recognize the importance of this kind of work," he proclaims, "and the 1980s will require very, very serious study of these issues. The spread of technology gains worldwide, an assimilation of the technological cornucopia of the last generation and our need to study conflict resolution means that we have to set a balance. I don't see technology as Heilbroner sees it, pushing society or running out of control. Technology has been a convenient scapegoat." In Dr. Gibbons' view, "new tools" are a worthy goal for humanity, and they can be derived from continued advances in science. "We can't put a cork on knowledge or start a new Inquisition."

Dr. Gibbons is no stranger to the capital. He was with the Federal Energy Administration (later DOE) and the old Atomic Energy Commission. There, his specialties were in conservation and environmental systems.

A PhD recipient from Duke in 1954, he headed nuclear geophysics at Oak Ridge for 15 years. He served on the Aspen Institute's energy research and development group, was a consultant to the National Science Foundation, to the National Bureau of Standards and to OTA before assuming leadership. He belongs to AAAS and the Sierra Club, plus a host of other professional organizations. Credits are carried in 50 publications, and Gibbons has achieved respect for his writings on technology, energy, ecology and the origins of elements in the solar system.

Under Dr. Gibbons' direction, the Office
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Clearinghouse

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the subject. "Asimov says he's not worried about the country being taken over by computers. He's worried we won't have time to invent a computer that can save us from ourselves before it's too late."

Rose is also concerned that U.S. scientists do not take research into psychic phenomena more seriously. Fearing that the Russians, who do take it seriously, are leaping ahead of us in the field, he wants to hold Congressional hearings on the subject.

But most of all, he believes lawmakers must exercise foresight when enacting legislation. "We must learn to anticipate in this time of rapid change if we are to survive," he said on the floor of the House. Quoting British novelist C.P. Snow, he added, "The sense of the future is behind all good politics. Unless we have it, we can give nothing either wise or decent to the world."

This "sense of the future" is what the Clearinghouse attempts to provide for Congress. "We're not a research group," explains director Cheatham. "We're about ideas. It's a way of thinking we're espousing. I think Congressmen can benefit from contact with various futurists, but we don't push any particular person or methods. We live in a time of questions, and we want to help Congressmen get comfortable with those questions, so they won't feel so alone when they wonder about them."

To that end, the Clearinghouse sponsors Dialogues on America's Future, where lawmakers are exposed to the divergent futuristic philosophies of speakers like Asimov, Arthur C. Clarke, Buckminster Fuller, Toffler, Margaret Mead, Herman Kahn and others.

"The gifts brought to us by these speakers as part of the Dialogues series are incalculable," asserts Representative Rose. "It is impossible to measure what has happened to the more than 125 members of the House and Senate who have attended these monthly dinners, but surely we are not the same as we were before we heard them."

The Clearinghouse also holds monthly seminars called Chatauquas, styled after a form of popular education that flourished in the late 19th and early 20th centuries. Multimedia events that combine entertainment, lectures, plays and exhibits, they cover a myriad of futurist topics.

Since its primary purpose is to provide Congress with information, 150 Congressional staffers cull 70 publications monthly to keep legislators up to date on future trends in science, technology, social sciences and other areas. The Clearinghouse issues a newsletter, *What's Next?* The monthly is distributed to 800 people on the Hill and 2,000 subscribers. It also publishes information packets and articles on futurist issues such as global resources and profiles of future technology. (You can obtain information about the newsletter and other Clearinghouse publica-

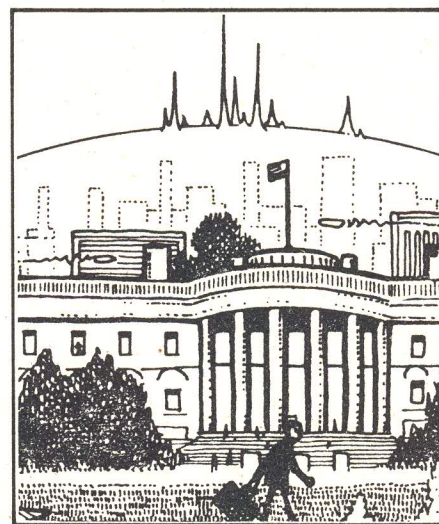
tions by contacting your Congressman.)

Because a clause in House rules passed in 1974 says Congressional committees should make an effort to use foresight in considering legislation, the Clearinghouse maintains a talent bank of 500 persons willing to present a "futurist point of view to Congress." Cheatham says that by giving futurists and citizens access to Congress, the Clearinghouse not only serves the institution, it also serves the public.

Futures Research Group analyst William L. Renfro emphasizes the importance of future-thinking in Congress. "Foresight—the art and science of looking to the future using forecasting and future research—is not a substitute for traditional legislative processes. Rather, it serves a supporting role by organizing the process of looking to the future in a systematic manner.

"Futures research as applied to public policy involves identifying the policies, programs, actions and other responses needed or required to turn the *expected* future into the *desired* future," asserts Renfro.

The Congressmen do not always know how to react to all this. One member calls the Clearinghouse "the science fiction wing of Congress." And, when Dr. Elise Boulding of the Behavioral Science Institute at the University of Colorado told Congressmen to



do some "social daydreaming," one said, "It's tough to daydream in Congress—we have two-year mentalities."

Still, Cheatham says things are changing. There are now 27 House and Senate members on the Clearinghouse board, chaired by Rep. Albert Gore (Democrat, Tenn.). More than 25 House and Senate committees have used the Clearinghouse talent bank. "The members are getting more serious about the whole subject of the future," Cheatham said. "They know they're bogged down in the present with an overload of information and nobody makes connections.

"But more than that, in some way I don't even understand, we have addressed a deep need in Congress to speak to people's sense of frustration and pain, to the awareness that you don't have to pretend you know exactly what to do, because nobody knows what to do right now." □

OTA

(continued from page 55)

will tackle some heady topics this year. Over 30 projects were chosen from a list of 4,000 in an effort to focus on priorities. Finding that "attainment of fusion could provide the world with an unlimited source of energy," this "very high technology" mode is under careful review. OTA's impact on the Congress was felt when it testified a dozen times last summer on synfuels. Reports on effects of the 200-mile offshore limit were well received, and data collected on residential energy conservation became widely circulated on Capitol Hill. The intended audience does listen, so Office staffers have a fighting chance of spreading the word. This means that House and Senate membership have access to working knowledge of such topics as: weather and climate for the remainder of this century; most beneficial uses of the space program; availability of water supplies; microprocessing forecasts and systems applications; future military hardware; and implications of increased longevity.

There is concern at the Office that the technology base which gave us Moon probes and galactic voyages may have dried up. Earthly applications of the NASA program are more likely in the 1980s than are the space spectaculars dreamed of—and hoped for—by futurists and other enthusiasts. Remote sensing, weather-watching and collecting info about farming should constitute the scenario. If the software, power generation, sensor characteristics, propulsion techniques and electronic systems connected with spacecraft are beefed up, then the rest of this century will show space stations and colonies.

Peering into their crystal ball, Office chiefs see the next 10 to 20 years shaped dramatically by telecommunications, digital message switching and the use of computer chips. Fiber optics will also play a role in this technological revolution. Home terminals and electronic transfers are only a start. Greater advances in air travel, through hydrogen fuel, will overshadow major shifts in the auto mode, where only incremental gains should be witnessed. Emphasis on recycling both minerals and other materials will develop as a hallmark of the next decade.

Most studies fall between the shadowland of quasi-fantasy and more down-to-earth topics. OTEC, prospects of space solar power stations and biomass energy potential are among the current priorities. Advantageous nutritional quotas, as well as an overview of mass transit through the near- and mid-term are other issues.

Claiming to present unbiased study of these topics, OTA uses not only its 130 staff members to conduct research, but keeps links with outside consultants by seeking top names in various fields. The Capitol Hill interlock means that the Office is plugged into the governing apparatus. That gives it drawing power.

"We never look for people who are going to take our money and just turn out another study," says Lionel Johns at the energy division. "They have to have standing in a field and be acknowledged." The Rand Institute, Hudson Institute (Herman Kahn's brainchild), Ford Foundation and Ivy League are well represented on various panels. IBM, Bell Laboratories, Xerox, environmental groups and representatives of organized labor all have a say. MIT, former Undersecretary of State McGeorge Bundy, economist Karl Hess, and Lester Brown of the Worldwatch Institute are given roles, too. Jerome Wiesner of MIT and Frank Press, chief science advisor to President Carter, also have input.

Studies are determined by the OTA Board—a group of House and Senate members—or by key Congressional committees. The option of a director choosing a topic is also available. Rep. Morris Udall (Dem.-Arizona) heads up the Board, and Alaska's Republican Senator Ted Stevens serves as number two.

The Board has standing above director Gibbons, and three divisions divide the research into specified fields: energy, materials and global security; health and life sciences; and science, information and transportation.

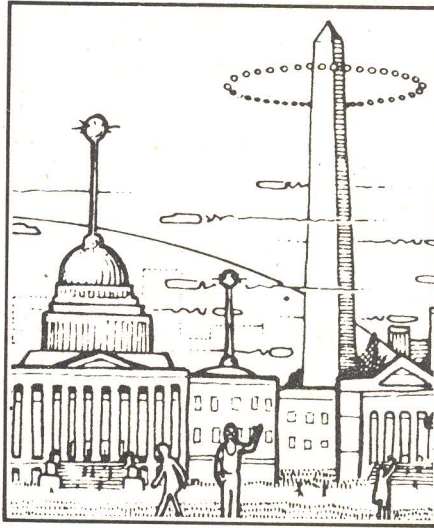
"We've been too inclined," says Gibbons, "to do big, comprehensive studies, but we have to take the work in bite-sized pieces. Our role is to keep these pieces in context." The director feels that an idea of what controversies are coming before the Congress is necessary, and in keeping with this strategy, an examination of energy's value in goods and services would be in order. There are inevitable delays once a subject is proposed, and a study can take up to one year from its genesis until completion. Three "levels of delivery" assure a readership for each report. A one-page flyer summarizes key points for harried lawmakers. At the opposite end, massive tomes, sometimes 300 pages long, unveil arcane features of each issue. Something middle-ground awaits serious students and elements of the bureaucracy. All told, some 100 surveys have reached an audience of about 70,000—much higher with the usual multiplier effect for any publication—over the years.

Believing that understanding semi-conductors will herald breakthroughs in solar conversion, Gibbons' scenario for the years ahead finds "traumatic shifts" in the energy front. "The lights are not going out, but there are unhappy surprises in store. We have to substitute efficiency, our ingenuity, for physical resources. That can be the good news. Any oil discoveries can only bail us out.

"There will be increasing options for use of solar power," says Gibbons, "and an advantage of this might be smaller systems for power, unlike the case of fusion. Oil has been embedded in our society, but the cost of solar conversions can equalize themselves to conventional forms in the transition period."

Space will be used for planetary surveillance with help from advanced optical systems. "The world will be much more

open, and the Third World should benefit when we learn how to manage our resources based on information from space." John Gibbons fears that the overall space effort will be hurt by limited funds and public concern over social change in the next decade. "Placing man outside geosynchronous orbit



is just not economical, and there's an awfully big dollar gap between costs for a space probe and another manned flight."

The vision of colonies in space is fanciful in Gibbons' opinion. "We're already on a space ship, we just have to manage it better." Costs of a solar satellite system are prohibitive and although rich ores are running low—as in the case of fossil fuels—supplies of non-premium quality would be available once more funds are given to search and processing. "You could use some materials on the lunar surface and just beneath it for a space station on the Moon, but I'm not sure about the economy of Moon mining right now. There's silicon up there, but there's silicon down here, and they have no carbon up there."

Microprocessing may dominate technological finds during the 1980s. "Everything from information systems to the whole way we practice medicine is going to be changed." Questions about privacy will surface, and white collar employment may suffer. The entire decade will see automation practiced on a grander scale, witness new social issues based on technology and find the developed world with a leveling of population.

These social issues and debates are to be centered around genetics. "The first wave is already here. Engineering of a single-cell microbe was the beginning; gene splicing and recombinant DNA are other steps. Super plants are underway now, and they'll resist weather and other factors." Technology, Gibbons declares, allows the best in nature to be used as animal stocks are upgraded, greatly increasing food productivity. "We have a new science that will be felt by all of us. It will show in the marketplace over the next ten years." Strides such as therapeutic abortions are among the controversies that are certain to cause "rethinking of technology in human terms and in terms of human values."

Anti-matter, "a real symmetry of property in matter," might one day be discovered, or

encountered, in other universes. Radio and infra-red astronomy is useful in knowledge of space and in any future contact. "If instruments were sensitive enough, the coded pulses and long-wave radiations we hear within our own galaxy might be an indication, but you'd have to go hundreds of light years. I don't think we will make any contact by the year 2000, but I'd love to be proved wrong." Dr. Gibbons is quick to dismiss some of the "romanticism" associated with such contact, rejecting the idea that our problems here can be eradicated once guidance from beyond instills wisdom in us.

He is also skeptical about time travel. "The only time machine, an FM Cyclotron, takes into account dilation associated with relativistic speeds. I don't think time travel is practical." Where would he like to commit resources of the Office if funds were adequate? On what he terms "conditions that amenities of life are sustainable in the United States." And probably outside our borders . . . and all borders.

While some in the sciences feel that OTA has been tending towards the conventional or conservative side, shying away from Buck Rogers-style investigations, critics at times assail its futuristic orientation. *Wall Street Journal* criticized its studies as having "fleeting or parochial interest." On the other hand, the House Science, Research and Technology Committee praised its efforts in a 1978 probe.

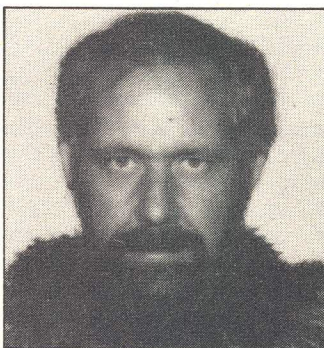
If a certain caution does inhibit the group, it is because of its proximity to Capitol Hill. Some studies hardly left the launching pad; others blew up in mid-orbit. A probe of alternate energy systems was killed after a year's effort in the pre-Gibbons era. In 1979, the outfit underspent its allocation, then furiously proceeded with misplaced ventures, resulting in Congressional cutbacks. When Ted Kennedy was Board chief he asked for a study on genetics and was turned down by a Board leery of controversy at the time.

Peter Johnson of OTA's oceans division expressed the view of many colleagues. "The public is not yet aware of dimensions we face in technology, and society's understanding of this exciting event is lagging." Johnson feels that breakthroughs will be seen in information about how oceans affect climate, but hints that more could be done with greater support. This, in Washington, means dollars. Indeed, allotting \$10-12 million to OTA when the federal largesse hovers in the \$600 billion range means that only .002 percent of the budget gets channelled towards classifying technology.

The jury is still out on OTA. As society moves into an uncharted future, some know-how is necessary for the government brass as they influence the shape of the 21st century. The Office will be more heavily relied on in the 1980s, and its research should reach beyond legislative arenas. Far from superficial, the group is plunging into critical regions, where probability runs parallel to imagination. It could play a strong part in technology issues, so that clear images emerge from present jig-saw puzzles.

Karl Kofoed

By BARBARA KRASNOFF



"I'd love to see movies really take us to an alien world," muses artist Karl Kofoed, "rather than places like Tatooine in *Star Wars*, which is a desert. You know, it's always some environment that you could very easily find on Earth. Even the classic job that Geiger did [in *Alien*]*—*he created just a beautiful alien, but if it hadn't been for the fact that it was photographed as intimately and strangely as it was, I think it would have been perceived as just another man in a suit."

Kofoed's aliens certainly could not be mistaken for men in suits, and his landscapes could not be found anywhere on this globe. The creator of *Galactic Geographic*, a series of *National Geographic*-type tours of other worlds in and out of our galaxy, Kofoed likes his extraterrestrials intensely and unmistakably alien.

Born in New York City, Karl had always been interested in space science. However, he soon found that his talents tended more toward the artistic than the scientific, and attended the Philadelphia College of Art, majoring in illustration. He then went through a series of art-related jobs, from tech illustration for General Electric to graphic commercial arts for television.

"Now I realize that I have been gifted with

a tremendous imagination," he says, "an unusual imagination. But people don't see themselves as being unique. And the fact that I had this imagination seemed kind of useless to me in my television career. It helped me get the jobs out, but basically I wasn't oriented toward that at all."

From television, Karl went on to an illustration position at a Philadelphia poster company. It was at that company that he got the impetus to embark on his career as a freelance science fiction artist.

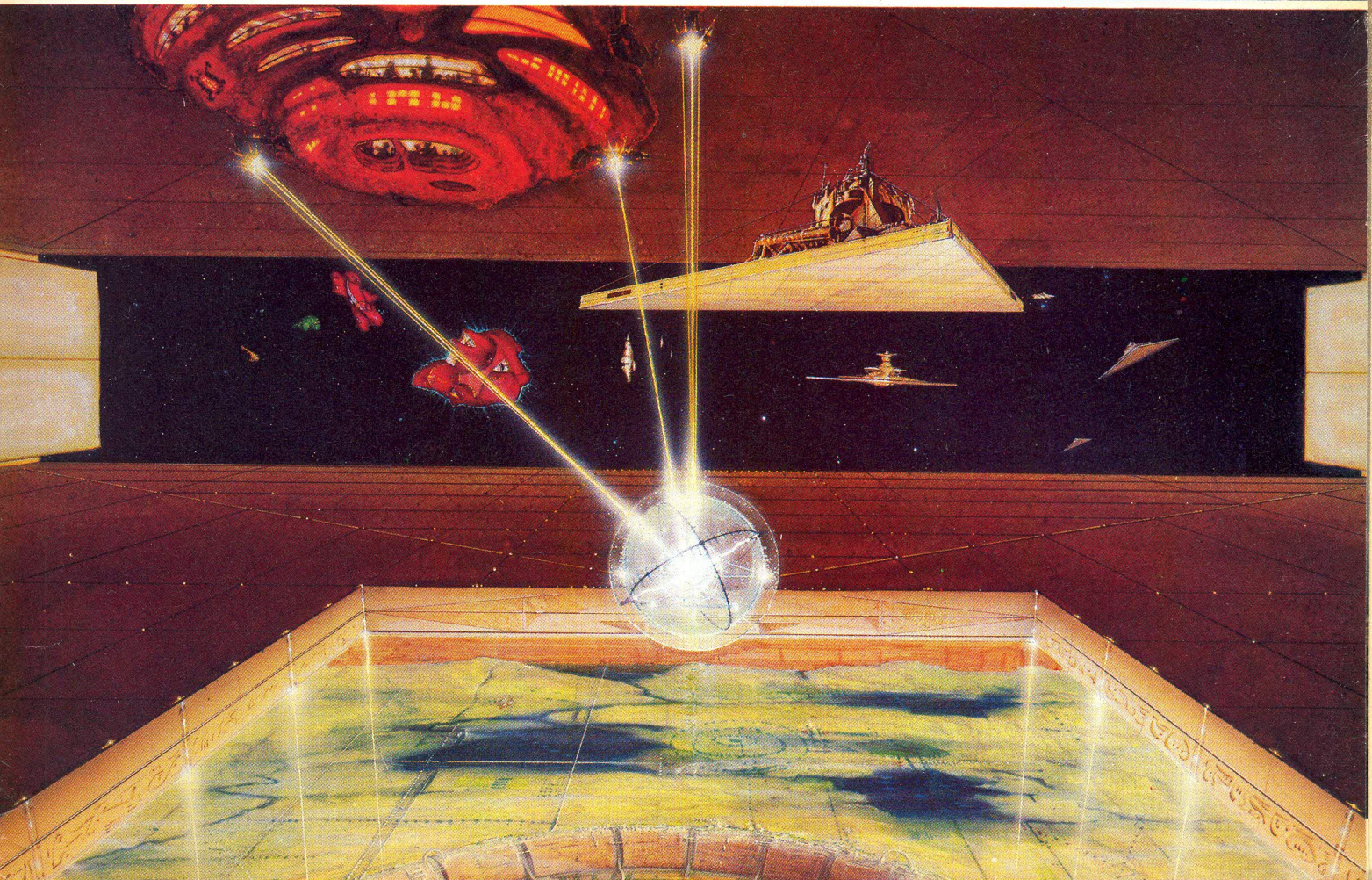
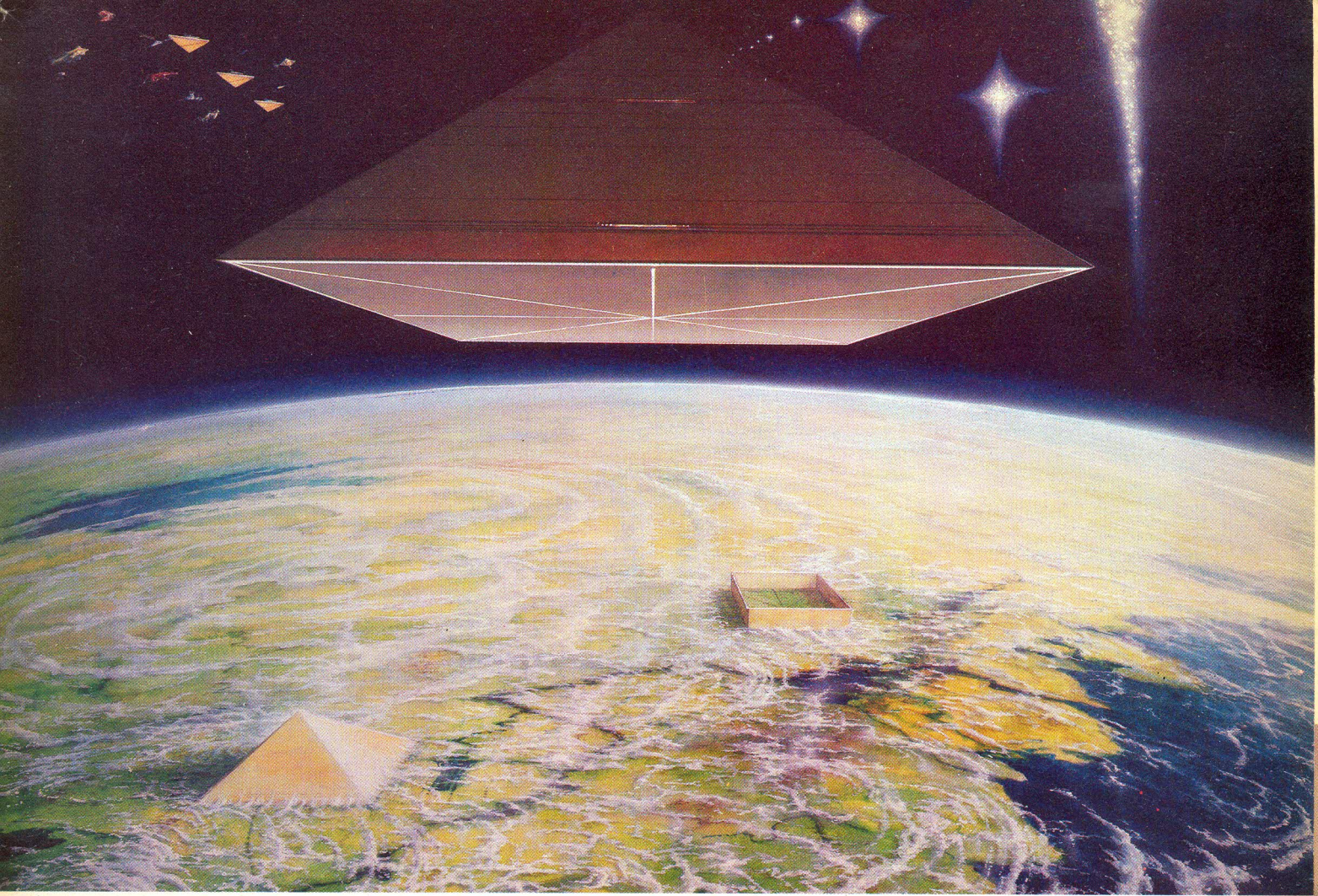
"I'd be working with another illustrator in a studio, and they'd look at my work and say, 'I've never seen anyone work like you do, as fast or with the imagination—just sitting there and drawing something and having it look right!' And I'd say, 'Really? No one else can...?'" Kofoed smiles at the memory. "And since that time three years ago, I've found that that's really true. I do have something unique. I'm not doing it for my ego, I'm doing it because I feel it's what I do best. It's what I'm capable of doing."

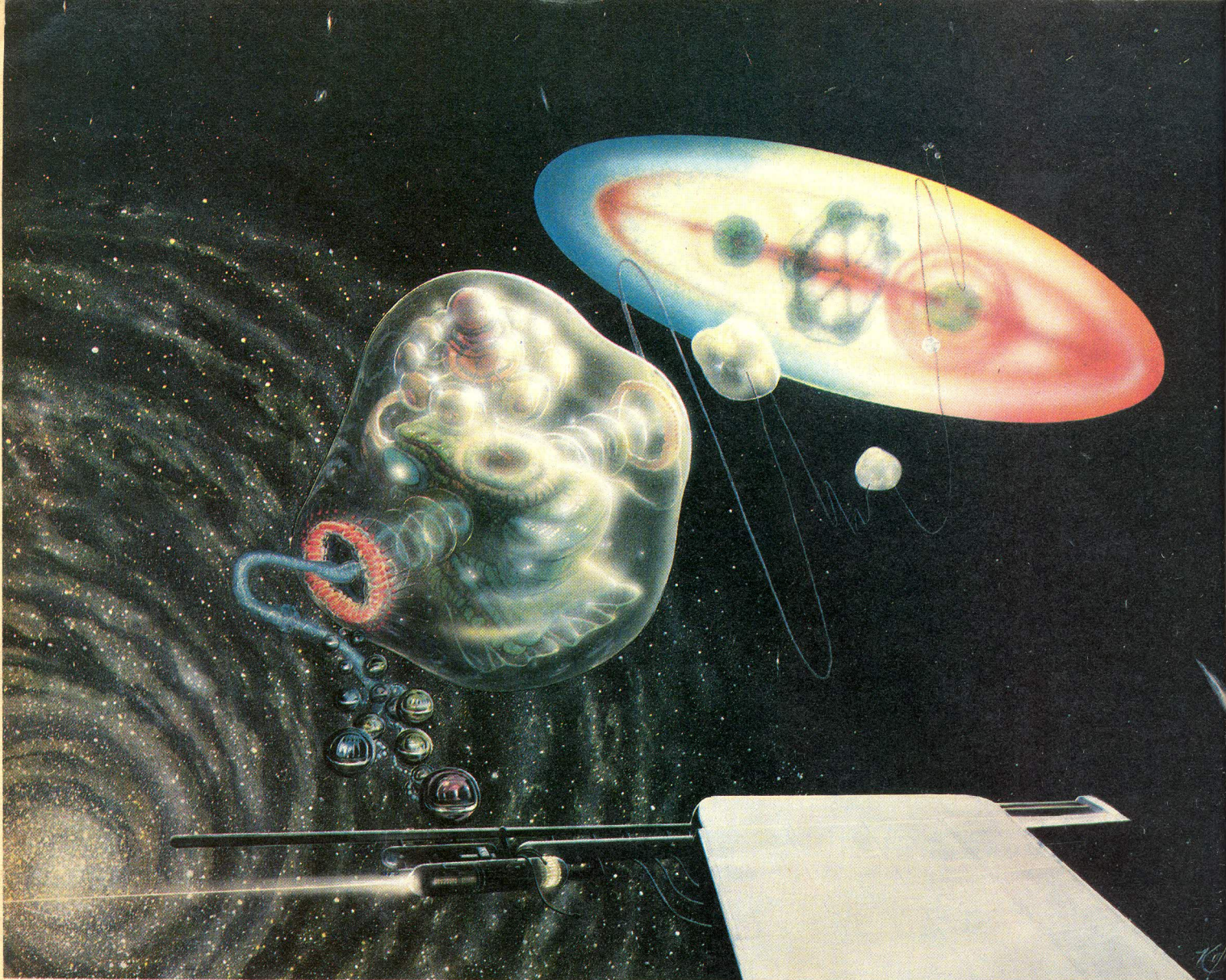
With that encouragement, Karl took some of his alien landscapes to the adult comic magazine *Heavy Metal*. "Sean Kelly, who was the editor preceding Ted White, said, 'We love your work, Karl, but we don't know

Above: "A Meeting of Civilizations." A Wo Ark, a giant emergency spacecraft built by a super race, leaves its home base to meet a group of alien spaceships. The stars on the right lead to a landing bay.

Below: The interior of the Wo ship.

A globular sentinel is busily disarming a Tsailerol ship prior to letting it descend into the landing bay below.





what to do with it.' I said, 'Well, how about I write a little blurb to go with it and we'll call it *Geographos Galactica*?' (Which is pig latin and just came off the top of my head.) 'You know I really have such a feeling for the way this thing should be written, I think I could probably do it pretty easily.' "

Kofoed grins ruefully. "That became the real monster in it, because writing the thing is very, very difficult. I have to assume that I am an editorial division rather than just one person, and I'm trying to extend society by, say, 1000 years, but at the same time keep it in a magazine format. It gets really silly after a while." So the renamed *Galactic Geographic* became a regular feature in *Heavy Metal*. A journalistic tour of the universe, it consists of a two-page spread illustrating some space or otherworldly scene accompanied by a semi-official-sounding commentary on the culture in question.

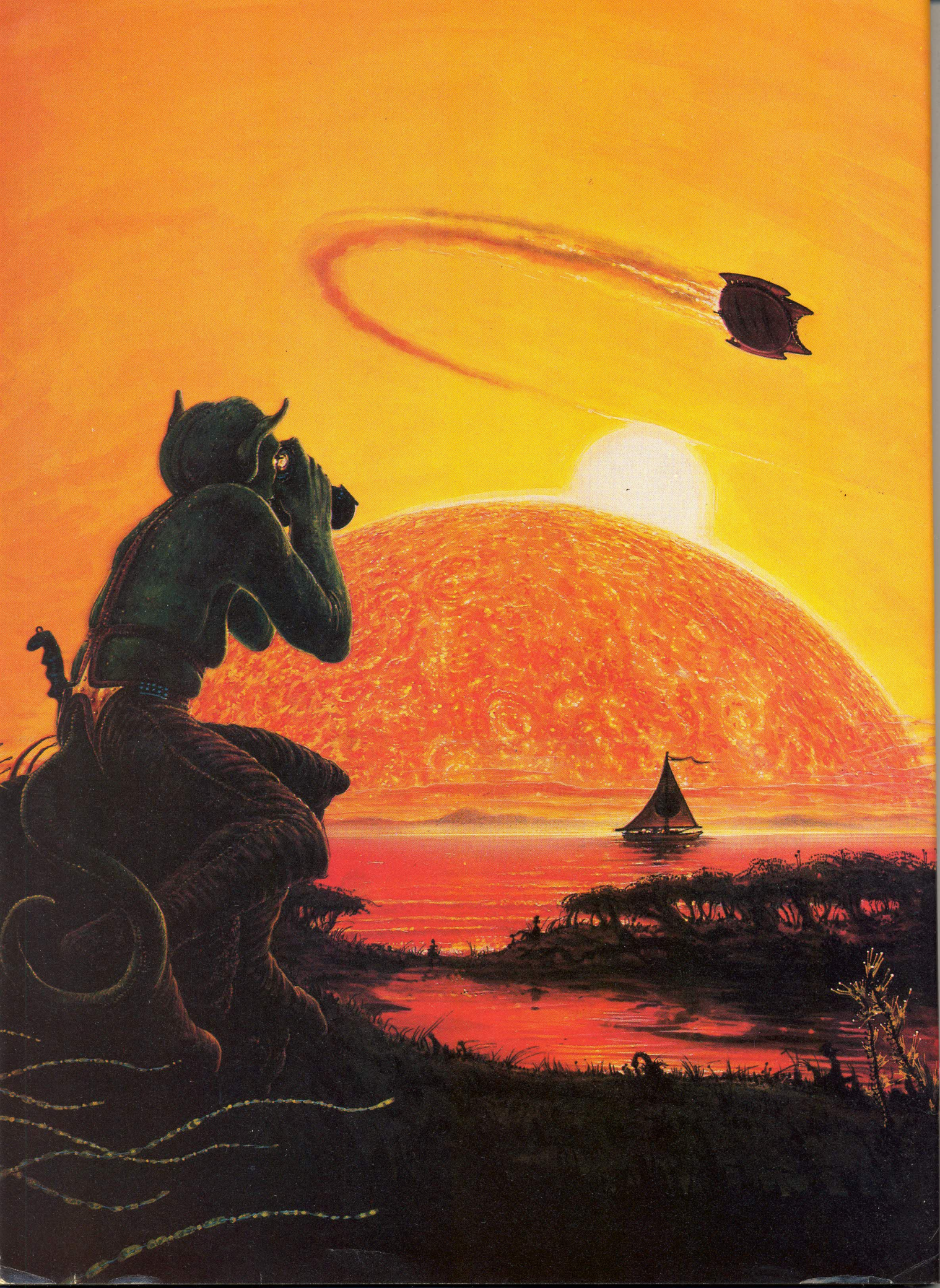
However, Kofoed soon began to find the format somewhat limiting. "Some people asked me, 'Why the two-page format? Why don't you extend it further?' Well I wasn't





Far left: In "Life in the Void," an automatic camera taking pictures of a new device (foreground) has accidentally recorded an unknown life form beyond the Milky Way.
 Left: Valerie, her car and an unfortunate alien. This multimedia photo was composed by Kofoed, Jim Wilson and Carl Waltzer.
 Below: Huge "air whales" sail by as a weird form of plant life watches from below. According to Kofoed, these whales emit a tremendously loud noise which causes local algae to become illuminated; they then easily scoop up the algae for food.
 Below, left: That creature peering out of the bog is only part of an enormously long snake creature. The "zoo ship" above is collecting samples of the planet's life forms for future study.





allowed to. I was limited as to how many pages they would give me. In the beginning, when Ted White came aboard (as new editor of *Heavy Metal*), he gave me a big criticism of the whole thing, and said, 'I think it's a little limited; I think it should be more than two pages,' which is something I'd been saying all along."

So Galactic Geographic evolved into Stellar Journals. This new feature, which somewhat resembles *Look* magazine in space, not only represented an expanded format for Karl, but a new form of art as well.

"I started experimenting with collage using a picture as the basis of my illustration," he explains. "My ultimate goal throughout all of these things is to give more than descriptions of alien worlds, more like a magazine or an article from tomorrow. Stellar Journals was kind of an alternative to the Galactic Geographic. It's meant to be coupled with it, possibly in an ultimate book. It's kind of turning over a new leaf, so to speak, but keeping it still integrated into a basic subject matter that I feel is as broad and long and far-reaching as I care to take it. Because I've been aware for a long time that Galactic Geographic could be a magazine unto itself.

"I keep the Galactic Geographic agency as a kind of background tie-together. It's really just a bureau of licenses, and that's the mode by which we get these 'articles,' through this hypothetical organization. Actually, I'm more interested in going into the planets, investigating them and keeping the whole space agency/human aspect out of it. But I still have to do it, so slowly but surely the whole picture of the Galactic Geographic and the federation and how it works and how the starships work is all coming together."

Kofoed spends a great deal of thought planning out his worlds: their geography, their history and their lifeforms. "My dominant interest is in the description of alien worlds," he explains, "because I feel that there are very few people who seem to be producing aliens that are truly alien. Most of them have features that are very, very Earth-like: the talons of an eagle, the jaws of a lion, looking like a dragon. . . . I just got very bored with that. I felt that, by using certain artistic devices, you don't have to be so obvious about the root of your animal; you can have it be perceived as a creature by using different cues rather than having a person standing next to it. There are different clues to the shapes and description of a thing rather than just putting it up against a person or some recognizable object. The symmetry, for example, of a creature. I believe that because of cellular division, it tends to describe a symmetry. That's the one thing you can truly say about life forms versus inanimate objects: that they have an innate symmetry. It's about the only real true rule that I go by as far as aliens are concerned.

"I think of these things as entertainment,"

Kofoed explains, "and that's what they're geared to. I Disneyize my creatures to make them appealing and to make them somewhat recognizable. When I create an alien, I generally cartoon him to begin with and then start making him into a real creature so that it has some other quality that makes it appealing rather than it being an Earthlike creature. I find that cartooning somehow is a key to understanding how the creature is structured. Makes it more appealing, perhaps, to the eye."

And, no matter how weird the natives of his worlds become, they work. "I spend a lot of time creating the aliens," says Kofoed. "They are totally complimentary with their environment and a result of that environment. They're very well thought out in advance. I structure them, round out how their eyes work, whether they have eyes at all, that kind of thing. And so far I've chosen environments that are moderately Earthlike to see what other alternative species could come out of it."

"I really want to open young people's eyes to the idea that we do have a tomorrow. We have to keep pushing no matter how bleak things look, whether we're on the precipice of war or not. We can't stop thinking about tomorrow."

He smiles. "I do have to confess though, or at least acknowledge, that the life forms on this planet are so diverse, so *incredibly* diverse, that one is hard put to place one's imagination up against nature. Because just as we feel that we've reached the limits of a describable world in terms of what is possible, we're always finding new life forms. For example, they've just found new life forms underneath the ice at the Pole, where there was absolutely no possibility—no light, no anything—but where there's a will there's a way!

"I collect pages from old *National Geographics*, and I have a couple of pages that are straight out of the magazine that may very well be from another world entirely. Things from the interior of Australia, strange blossoms that shoot spikes 15 feet high. . . . So I often look at my stuff kind of bemusedly and say, 'I really can't top what nature's given us right here.'"

On the other hand, Kofoed is sometimes disappointed with the science fiction concepts that appear in today's media. "I think a little bit of substance, a little bit of thinking is allowed by the public," he asserts. "I took my daughter to see *The Black Hole* and she

wasn't fooled by any of it; she didn't like it, and she's 13 years old. She didn't like the heavy leaning on the robots, she didn't like the special effects that much and she thought it was boring (which it was). I mean, anything in the world, anything in the *universe* can happen near a black hole, and what happens? Nothing. A whirlpool in space with Captain Nemo."

And in between creating complex alien topographies, Kofoed finds time for other projects as well. "Creating my own stuff allows my ego to be expressed if that's required," he says. "Doing work for *Isaac Asimov's Science Fiction Magazine* and other magazines allows me to dabble in the established editorial illustration, which I love to do. I love to sit and paint and not worry about what the story is. And I've gotten some very good responses from some of the authors that I've done.

"And then, of course, there's the advertising market, which I do as a separate item. This photographic piece is oriented along that line. It's applying my imagination to different media concepts, working with the people who are involved with three dimensional things and photography, all of which I'm very well versed at. But I'm trying really to focus my abilities into one particular area. So I'm developing an advertising portfolio at this point."

The photographic piece he is referring to is the otherworldly auto accident shown on page 61. As yet unnamed, it is one of a series of pictures. "The whole series was planned to be the adventures of Valerie throughout space," explains Kofoed. "We just put her into all these different environments, and the goal was to make it seem as though she had really been in all these other worlds. I built the basic set and the creature; Jim Wilson built the car and together he and I worked out the conception as to what the picture would be. The picture of the girl was taken by photographer Carl Waltzer. Carl had taken the photos for Larry LeGaspie, who designed fashions for Kiss and LaBelle among many other rock and roll groups.

"In this particular scenario, she's enroute to some other place on this planet, and she's going through this washed-out river bed and along comes this creature. She happens to run into it and it gets stuck under the wheel of her car and there's poor Valerie. . . . I just like her attitude. It's like she's above all this."

One future project that Kofoed is very enthusiastic about is a possible book based on Hal Clement's novel *Mission to Gravity*. "It's a project I've been talking about for about two years now with Harry Stubbs (Hal Clement) wherein we, the Galactic Geographic, go to Mesklin [the planet described in the novel]. It would be a book documenting a mission to Mesklin in terms of photographs and illustrations. But that hasn't gotten underway yet at all, and it's still in the formative stage.

'As may be expected from such a space-conscious artist, Karl would jump at the chance for a ride in the space shuttle. 'I'd

(continued on page 74)

A Thistik watches a boat as twin suns rise on the horizon. This cover illustration of Joe Clayton's "A Thirst For Broken Water" appeared on *Isaac Asimov's SF Magazine*.

STARLOG TRADING POST

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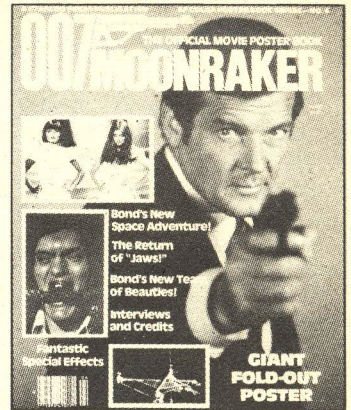
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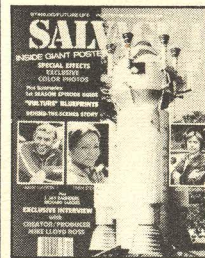
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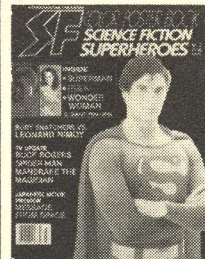
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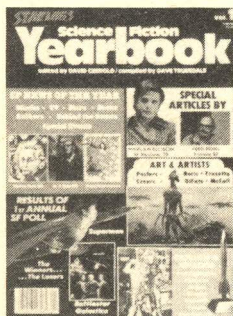
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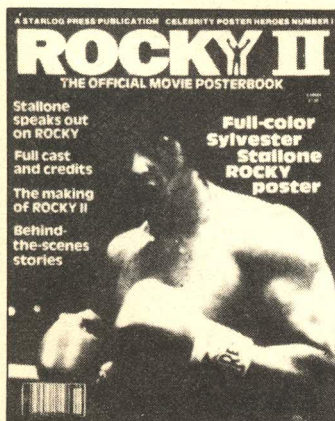


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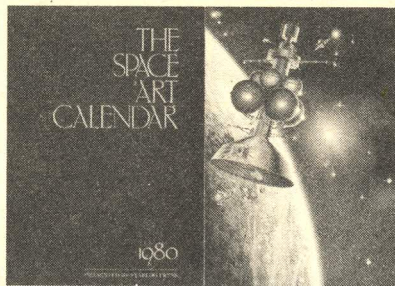
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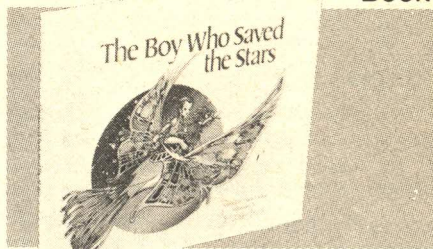
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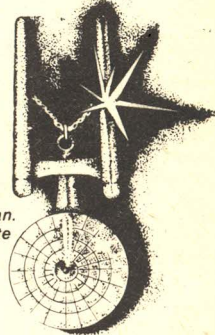


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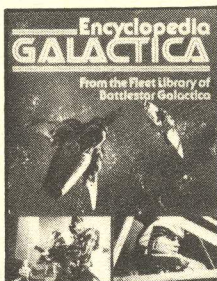
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Lasers

(continued from page 43)

terference patterns, looking like webs or clouds, and diffraction patterns, which break up the light and make symmetrical mosaics.

These images often appear to be three-dimensional because the purity and vibrancy of the colors make them appear to be at different distances because the eye focuses each at a slightly different position.

The laserist uses switches and knobs on the mixing console to turn certain effects on or off, add images and control color capabilities. He uses tilt and fold joysticks to move and position the effects on the screen.

Image synthesizers like those sold by Laser Displays of Boston are capable of three axes of rotation, sawtooth, square and triangle wave oscillation, and aerial and geometric perspective.

The entire system—image synthesizer, projection head, chassis and mounting—can cost from \$4,200 for the Lasertronic "Lasertrace" (including a five milliwatt helium-neon red laser) to \$85,000 for the Laser Images system, without the laser. To rent the system for a night or a week costs around \$7,000.

Once the beam is out of the machine, it is up to the operator to make sure it is aimed in the right place and that it properly "entertains" the audience. That is where the artistic end of laser light shows comes in.

John Tilp, who develops shows for Laserium, calls his skill "sculpting with light."

"The idea of correlating light and music has been around for a long time," Tilp says. "The laser is the best tool available to paint music with light, but you have to remember that lasers are designed for industrial cutting. They weren't made for entertainment."

Nonetheless, a laser light show is probably the first form of color-music synchronization to approach the ideal merger of the human senses of seeing and hearing that artists have been seeking for centuries.

Beethoven, Schubert and Rimsky-Korsakov associated colors to keys. As far back as 1720 Louis Bertrand Castel, a Jesuit priest, devised a "Clavessin Oculaire" which worked with prisms and translucent tapes in natural daylight admitted through a window into a darkened room.

The most devoted of color-musicians was Alexander Scriabin, the Russian composer, mystic and piano virtuoso. In "Promethee, Le Poeme du Feu" (Op. 60, 1910) he included a part for A.W. Rimginton's color organ. The first performance took place in Carnegie Hall in 1915 where colored lights were thrown against a screen while the audience sat in darkness.

Thomas Wilford established the art of "lumia" with his "Clavilux" in 1922. Wilford's major contribution was to remove the idea of an exact one-to-one correspondence between note and pitch, and replace it with a *general* coordination of musical and optical motion. This gave rise to the light

shows of today, of which the laser is the most spectacular.

More "pure" abstract applications would include the media of cinema, video and animation. Silent movies had a musical accompaniment for the house organist, which is now an integral part of the soundtrack. Walt Disney's classic "Fantasia" includes in its opening selection Stokowski's adaptation of *Bach's Toccata and Fugue in D Minor*, and he freely and vividly associates color and forms.

Not until 1973 when Ivan Dryer performed the first "Laserium" show at Griffith Park Observatory in Los Angeles was the mastery of Disney's animators equaled.

Fittingly enough, the most important tool of the 20th century originated in the most important mind of the 20th century. To Albert Einstein goes the credit of postulating the physics necessary to create the laser.

Einstein summed up the work of physicists Michael Faraday and James Clerk Maxwell and mathematician Max Planck to devise the laser theory. Faraday had experimented in relating electrical charges and currents with electric and magnetic fields. Maxwell set down formulae implying the existence of electromagnetic radiation, encompassing gamma rays, X-rays, ultra violet light, visible light, infrared and radio. In 1900, Planck developed his Quantum Theory, in which he assumed that radiant energy was not emitted in flowing streams, but in bundles, or quanta.

Radiant energy consists of cosmic rays, gamma rays, X-rays, light (ultra-violet, visible, infrared), radio (radar, television, FM, diathermy, wireless, short wave and commercial broadcasting) and heat. Einstein postulated that all these forms actually travel through space in separate and discontinuous quanta.

Although visible light is only a small portion of the electromagnetic spectrum, Einstein saw that if it could be harnessed it would be a great source of unlimited controlled energy. This could be done if ordinary light waves, which are diffused and of many different (incoherent) wave lengths, could be coordinated in space and time and have nearly the same length.

In 1959 physicist Gordon Gould filed the first laser patent with the U.S. Patent Office. Today laser industry sales are estimated to be running at an annual rate of between \$750 million and \$2.5 billion, reports Robert Kearns of the *Chicago Tribune*. Eugene Lang, Gould's partner in Refac Technology Development Corp., expects laser sales to reach the \$10 billion mark annually by 1990. Ivan Dryer puts the current laser entertainment industry at \$20 million annually. Impressive as these figures are, it's only the beginning.

By the end of the decade, major universities will offer courses in "lumiagraphy." Students will study the history of color in paintings, prints and poems, and the art, myth and magic of the rainbow. They will study the physics of the spectrum, light, color and the stars. They will study the human "eye-brain," and the anatomy and

psychology of how we see. They will learn about the motions of the universe, harmony and harmonics, the music of the spheres, and the search for the spectral song. The common denominator will be the laser beam.

Despite this the laser cannot shake the heritage bequeathed by H.G. Wells. Today lasers are being used as target designators for Army tanks, Marine grenade launchers and F-5F jet fighters. The electro-optical devices pinpoint targets for laser-homing weapons, which use conventional explosives to destroy a target. And before the end of the decade high-intensity chemical laser weaponry will be deployed to destroy incoming ballistic missiles.

Scientists foresee the giant lasers of tomorrow triggering the fusion of atomic hydrogen to release useful amounts of energy, and even launching rockets into space.

It was said that Jules Verne bitterly resented H.G. Wells' literary license in "inventing" substances like anti-gravity to make his stories more interesting. The two men represented the conflict between "hard" and "soft" science fiction. Verne demanded that the scientific basis of a story be closely tied to existing facts. Wells relied on his skills as an author to make his premise appear to be scientific when it was no more than pure speculation.

Both men were right to some degree in their predictions about the laser. It remains to be seen which of "the fathers of science fiction" was closest to the truth. □

Earth Control

(continued from page 32)

country needs the energy that these power plants and oil wells can produce; and cities are not going to stop growing. But what the Year of the Coast organizers want is to establish some intelligent, frank debate on just how this country can satisfy society's needs without destroying the environment. Americans may well have to bite the bullet and seriously consider lifestyle changes if they want to save such pristine areas as the coastlines. There are promising moves being made in some states to protect the coast, but it is not enough. Hopefully, the Year of the Coast can mark the beginning of a mass effort to establish a sensible set of priorities and preserve our invaluable coastal areas for future use and enjoyment.

Scores of Year of the Coast activities are planned through the rest of the year. Every major environmental organization is hosting numerous events, many states and cities are planning to join in, and Year of the Coast groups spring up every day. The Coast Alliance was organized last year as a clearing house for Year of the Coast events, as well as to review existing legislation and propose new laws. For more information, contact the Coast Alliance at PO Box 2708, Washington, DC 20013. □

Empire

(continued from page 19)

one to come, was spliced onto these two, you'd have six hours of film designed as a single storyline. You see and feel the logical progression of movement in *The Empire Strikes Back*."

Groundwork Begins

With script in hand, producer Kurtz and director Kershner began the task of mounting the mammoth spectacle. "A film like this requires an immeasurable amount of precision planning," says Kershner. "Much of the work that you would ordinarily do the week before shooting, the day before shooting or even the moment of shooting on a conventional film, you must do months before. You have to visualize the way you're going to stage a scene, the angle you're going to shoot it from, where the people will be, what the perspective will be, even what lens you will be using before the sets are even built. You're sitting there with pencils and pieces of paper making preliminary sketches saying 'OK. This is it.' That starts a whole chain of events going. The sets are built according to your sketches. You have to then actually shoot according to your sketches. There isn't a chance for coverage because it takes so long to set up each shot because of the machinery involved, etc. You have to make each shot count. You have to make sure that the pre-editing that goes on in a director's mind works."

"We started photography in 1979," says producer Kurtz. "But we had started the art department working approximately one year before that. We knew from the very beginning that this would be an awesome project to tackle. The most difficult aspect of getting a film like this together is keeping the original vision intact. When you have 500 people working on a film, there can be a lot of communication gaps."

Communications proved to be just one of the hurdles Kurtz and company had to clear. Everyone involved with the *Empire* realized from the outset that *Star Wars*, with its wondrous special effects, would be a tough act to follow. It had, according to most film followers, redefined the state of the art. Nothing less could be expected from its sequel. Kurtz, Kershner and special effects supervisors Brian Johnson and Richard Edlund set out to conjure up their expensive brand of wizardry during a particularly touchy time for effects fanatics in Hollywood. The \$40 million *Star Trek* was writhing in agony as a result of a multi-million SFX foul-up and AIP's massive *Meteor*, destined to stiff at the box office, was earning a reputation for itself by seemingly firing an effects crew a week. Surrounded by such calamities, the *Empire* crew stuck to their guns and went ahead with planning an avalanche of eye-boggling effects.

"We put a lot of time into our special effects for a reason," Kurtz states. "Contrary to a lot of opinion in Hollywood, it's possible to have a movie with a lot of effects and not



Director Kershner and producer Kurtz peruse *Empire's* scene-by-scene story boards.

let them take over the production. It's not hard to keep a rein on effects. If you don't want them to rule your production, they won't. It's all a matter of precision planning. It's possible, conceptually, for a movie maker to begin a film and not be aware of the problems involved. A writer can put down anything on paper. A lot of filmmakers then get stuck when they're faced with the problem of realizing what's written on the screen. That's a problem faced by a lot of science fiction films.

"To succeed visually, you really have to think out all your effects in advance. You have to figure out which is the best way to plan each shot because there are usually seven or eight ways to do everything. You have to come up with a good balance between what's going to look best, the creative side, and how much it's going to cost, the financial angle. Once you've done that, I think the resulting structure pretty much keeps your special effects under control. The key thing to remember is that the effects should be subordinate to the storyline. It should be like that in any movie, science fiction or otherwise. The special effects should be thought of like any other pictorial element and planned for accordingly."

Aiding Kurtz and Kershner in the planning were Brian Johnson and Richard Edlund, two effects pros who made sure every effect was visualized months before the cameras rolled. "Everything was preplanned," Johnson emphasizes. "Our storyboards even have frame counts on them with the precise number of frames needed for each individual shot. The film was going to be cut precisely. We knew beforehand, for instance, that shot M154 needed 112 frames. There's obviously flexibility in that, but you know pretty much whether it's going to be a one second or a half second shot. It required a lot of thought but it worked out nicely.

"The forethought was necessary because we've run the gamut of effects on this one; from pyrotechnic effects and practical effects on main unit shooting right through to miniature model shooting, animation, optical work, high speed photography and matte work. The finished film is like an en-

cyclopedia of special effects."

Despite the planning, the *Empire* managed to find itself bogged down as the result of totally unexpected disasters; not the type of calamities caused by human error but the variety caused by what insidious insurance agencies laughingly refer to as "acts of God." "We needed snow for the big opening battle sequence on the ice planet Hoth," recalls director Kershner. "We could have done it at our studios in England, but the movie would have then started off looking artificial. We decided to go for reality. We set off for Norway. Unfortunately, it was Norway's coldest winter in 100 years. It meant shooting day after day in 26-degrees-below-zero weather with snow blowing.

"We were at Finse, a glacier between Oslo and Bergen. It was incredible going to work in the morning and seeing a herd of reindeer walking on this sheet of ice. Just staying outside was difficult. We had to bring in snow tractors from Sweden. An army of them would move the equipment up the plateau to the glacier. We had to put nine-foot markers in the snow along the way because if the snow started blowing, you were lost. You could fall into a 1,000-foot crevasse.

"You couldn't touch metal without a glove because your hand would stick and have to be cut away with a razor. It was brutal. We'd have to stand up all day and keep moving. Food would turn ice cold as we ate it. The lens would cover up with ice, too."

Brian Johnson continues the tale of epic woe. "There was one railway line which operated between Bergen and Oslo and we were on the highest point of the line. We stayed at this solitary hotel which is normally used as shelter for these maniac Laplanders who just ski on horizontal slopes for mile after mile, get lost, and then have to be rescued and brought to safety by search parties. The hotel conditions were spartan to say the least. Plus, the place featured typical Scandinavian heating inside... which is to say that it was like living in one huge sauna. You couldn't open the windows for ventilation, either, because they were iced solid.

"Outside, it was the worst weather of the century. It wasn't the easiest place to make a

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movie. Yet, there we were, filming a fantasy when the realities of life were becoming all too apparent around us. I mean, if someone gets lost in a snowstorm and they're not versed in any form of survival, they are going to die. We had to keep tabs on everyone as well as worrying about getting the right shot. We were lugging around equipment, too. When you're 5,000 feet up on a mountain with the air very thin, you find that, after a day of this, you are quite dead. Adding to the hilarity, we had two avalanches occur which sealed us off from the railway line, stranding us for a few days."

Producer Kurtz fondly remembers the disaster-in-the-making. "The avalanche wasn't a major problem," he says. "It makes a good story, but in terms of actual shooting, it didn't hurt us all that much. We *did* have a problem getting Harrison Ford onto that location, though. We had to pick him up at the furthest point the local train would go. Then we put him into a four-wheel vehicle that took him up to the next railway stop. Then we had the railroad snow plow take him the rest of the way. By the time he got up there, it had been a 24-hour jaunt from his hotel to the location. He was more than a little tired.

"The thing that hurt us the most on this movie," Kurtz continues, "was the fact that one of the sound stages at Elstree, England, burned down just before we were ready to shoot. It wasn't one of the stages we were scheduled to use. It was being used by Stanley Kubrick for *The Shining*. But he wasn't finished shooting yet, so the fire delayed him getting off the two other stages he was filming on. His schedule was pushed back. Some of his sets had to be rebuilt. That, in turn, delayed our taking over the stages we needed.

"Our art department then had a very hard time keeping up with our shooting schedule. We had to rearrange which stages the sets would be on and rearrange our shooting sequence. We never did fully recover from that. We were delayed several times as a result. People would be shooting in one area of the stage and, across the room, sets would be under construction. By the time we reached June and July of 1979, we had to stop shooting so the art department could catch up with their construction. Making things even more difficult was the fact that the last winter in England was very rough, so the construction of the burnt-out set at Elstree was delayed. We had to start the construction of our ice hangar set on the stage before the stage itself had been totally rebuilt."

Kurtz found himself being quite philosophical about the entire mess. "I think when these sorts of disasters occur, even though they cause delays, it sort of brings the crew together. You feel a spirit of super-camaraderie. You know, 'We're going to get this done and done right no matter what the odds.' That's a nice crisis mentality to live with. It can be a very encouraging factor on a tough location. The *Empire* was sort of a strange film to work on. On one hand, you had this 'school spirit' feeling and, at the same time, you had a 'class reunion' mentality running, too. Everyone was determined to make this movie work."

The Making of an Empire

When shooting actually commenced in earnest, the cast and crew of *The Empire Strikes Back* found themselves taxed by pressures they hadn't dreamed of. In the front lines was director Kershner who, up until this point, had directed somewhat more conventional stories with down-to-earth characters. Faced with eliciting emotional responses from leads with faces of fur and bodies of iron, the quick-thinking director opted for the easiest way out.

"I treated them as if they were human," he shrugs. "If I was working with R2, I talked to R2 and not to the people working him; whether it was the electronics people in the back or the actor inside. I would talk to 3PO as if it was 3PO. I found that my direction was best handled when I was talking and looking at the creature. If I was dealing with Chewbacca, I'd try to talk with the actor only when he was fully costumed. Then I was starring at the Wookiee and not an actor in a suit. That helped tremendously.

"I never told anyone I was doing this



Harrison Ford is a tortured soul in *Empire*. Han Solo takes his lumps in this go-round.

because they would have thought I was out of my head. In fact, I finally started talking to my garbage cans at home. I'd be going to toss out some trash and I'd tell it 'open up.' I couldn't understand why it wouldn't obey me. The gadgetry becomes terribly real after a time."

Although the *Empire's* almost surrealistic settings unnerved the director at times, the parties under the most pressure turned out to be the actors. "The actors were phenomenal in this film," says Gary Kurtz. "In the first movie, everyone had a good time, but physically, it wasn't too difficult for them. In *Empire*, everyone enjoyed their expanded characterizations a lot, but the production was grueling. We had a longer shooting schedule and the sets were truly bizarre.

"I think Mark Hamill suffered the most. I'd like to see the *Empire* emphasized by the press on the basis of the development of the Luke Skywalker character. It's a story of him growing up further. That's it in a nutshell. Luke's confrontation with Darth Vader is probably the most important element. *Empire* is a rites of passage film. Because of that,

Luke is the center of attention quite a bit which, in turn, meant that Mark had a lot of stunts to do. He spent weeks and weeks before shooting, working out in terms of body building and karate and sword fighting and everything imaginable. He used it all on the set. By the time the picture was nearing completion, he was the last actor before the cameras. Boy, was he glad to see this movie end!"

Shooting was also a challenge for Harrison Ford and Carrie Fisher. As much put-upon Han Solo, Ford had to hang suspended for hours during a grueling torture chamber scene. For four days he had to sit strapped into a jiggling pilot's seat while bellowing the word "asteroids!" at the top of his lungs. In true heroic style, however, he grinned and bore his thespian chores stoically.

Carrie Fisher, as the ever-fighting Princess Leia, was so happy to see her shooting draw to an end that, on her final day on the set, she ordered tacos and champagne for the entire cast and crew. This proved somewhat difficult in that *Empire* was shot in England and half the caterers in the area thought that a taco was a strange South American foot disease. Fisher persevered, however, and left the cast and crew satiated. As it turned out, they needed all the strength they could muster for the film's final, arduous weeks.

Irvin Kershner concedes that the movie was rough. "Rough?" he laughs. "It was beyond rough! It was crazy. It was the most intense experience in my life! But the actors were wonderful. Everyone was so high about this film, their motivation was so intense that, despite the hardship, people were killing themselves to get it done. Not just to get it over with but to get it done right. Everyone seemed to have a stake in making the film come alive. Mark was literally killing himself at times. He was hanging 40 feet over the floor of the stage, attached to a little tiny safety wire in case he fell off. The thing would have broken had he fallen and he knew it. All that would have cushioned his fall was a bunch of boxes on the floor. He was walking along girders, with wind machines blowing in his face. He was lying in the snow in Norway in sub-zero weather trying to emote when, within one minute, the chill factor was so great that his body began to shake involuntarily. Rough?"

"Poor Chewbacca almost broke down. He was physically drained. He just couldn't run anymore. We gave him a couple of days off to recover. 3PO had it rough, too. He was all over the place, trying to run up stairs, up ramps, being hurled around the spaceship. He was exhausted. It was most painful for them both.

"I'd throw my hands into the air in desperation about three times a day, but I'd bring them down really quickly. The pressure was great, but the good nature of the cast got us through it. I mean, I was working seven days a week for nine months. I'd shoot either five or six days and on the seventh day, I'd go to the studio and plan the next week's shoot. There was no let up. We had 64 sets to cover besides location work. That's astronomical.

"And the sets were damned peculiar to work on, too. There was one set where jets of

steam shot into your face and you had to ignore them; pretend they weren't there. It was all part of the set. The heat would really build up in these places, too. We had dozens of arc lights going, plus the fog machines, plus the steam going off and we had a tin roof on the stage to boot. We were often working 30 feet in the air so we were really in the middle of this heat wave. We'd be up there filming for weeks.

"The interior set for the ice cave was pretty painful, too. We were living for days in these man-made caverns. They were covered with salt for a glistening effect. There was so much salt there that it got into our lungs, our pores. We could taste the salt all day and all night.

"For scenes with fog or mist, we had to keep shooting heated mineral oil into the air because the effects folks claimed it was healthier than the vegetable oil used in America for fog scenes. After a while we couldn't breathe, let alone smell anything. We'd leave the sets exhausted, with no sense of smell and reeking of salt.

"For the bog planet, our stage was so large that we actually generated massive temperature inversions. We'd get ready for a scene: Everything would be set. Pools of water beneath the twisted, gnarled trees. We'd shoot the oil into the air for fog effects and we'd have to wait for it to find its level. It would just hang there in the air because of the inversion. It was horizontal to the floor. One thin sheet of oil that you could actually see. We'd have to wait until it dispersed and started to look like actual mist. The set was so large and so high that it was its own environment. There was no air moving. Total stagnation.

"Another little quirk we had to contend with was the constant checking on our degree of disbelief. I mean, here you were sitting up on this big animal that was made of skin and steel and rubber and trying not to feel silly. Or here you were, literally hanging in the air by a thread, and trying to act when you're twirling around. Or here you were coming out of a tube, falling into boxes 15 feet below and the camera is upside down and the set is upside down and everybody is trying to act like it's rightside up. You start to lose your sense of rational judgement after a while if you're not careful.

"We got through it, though. There were only a few moments during the six months of shooting when someone actually neared the breaking point. At one point, Mark had to take a fall and he broke his thumb. The pain was excruciating. He was writhing on the floor, face contorted, covered with salt. I think, at that point, he wouldn't have minded never seeing any of us ever again."

After seemingly endless months of filming, *Empire* closed down its British studios. A wrap party was held but, par for the film, was not a very conventional affair. "We had it on the worst set of all," Kershner laughs, "the bog planet. We cleaned it up a little bit and put runways over the bog so people wouldn't fall into the water. We actually had 12 people walk into the swamp because you couldn't see where the land ended and the water began. It was a great party. It was like armistice day. *The war is over! We have triumphed!*"

The Empire Arrives

With over two years of planning and production behind it, *The Empire Strikes Back* is now a reality. Prints were delivered to a select group of theaters in May and yet another dose of *Star Wars* fever was launched. Audiences seem quite happy with the finished film, thus reflecting the feelings of the filmmakers themselves.

Says writer Kasdan, "The ideal review, for me, would say that this movie takes the landscape that George Lucas created in *Star Wars* and takes us over the horizon, extending the emotional and physical terrain further. The characters on that extended journey have become more complex, believable. You understand them more as people and, yet, the movie continues the first film's wonderful spirit of adventure and fun. Despite the fact that the *Empire* is pretty grim at times, it still is pretty lighthearted. It's from the same family tree as *Star Wars*, having all the attributes of the original. It's more like an older brother."

Kurtz agrees with Kasdan, adding, "It's a bit more ambitious. It's possible that this movie may lose some of the more carefree fans of the first but we knew from the outset that no matter how good it was, it would disappoint a certain number of people who have a pre-conceived notion of what the second film should be like. I don't think it's possible to please everybody. That wasn't our reason for making the *Empire*. This is a film that stands on its own merits."

Director Kershner sees the film's new wrinkles in a slightly more practical, subtle light. "The great thing about this movie is that you're not going to know, most of the time, what is a special effect and what's not. That's what I wanted to do. I wanted to hide them so no one would say 'whoa, lookit that shot!' or 'lookit that marvelous thing!' We have a strong story and we played that up. You'll wind up accepting everything as part of the story. You know: 'Hey, this is space. Here's a planet. There's a gadget that crawls. Yeah. Here's one that walks. There's a strange animal. Sure, it's a real animal. Here's a tunnel really made of snow and ice.' You won't know they're special effects. That means we'll be successful. You'll be enjoying the picture. Your concentration won't be broken by 'lookit that!' Our whole intention was to play our special effects the way Heifetz plays the violin. You know. 'Hey. He makes it look easy. Anybody can do it. I can do it if I want to.' This movie has content. But first, I want it to be fun. Emotionally and story-wise, it's provocative. I'm interested in its sum communicative value, not people marveling at the special effects."

Special effects wizard Brian Johnson echoes Kershner's views, adding, "There are things in this movie that are damned thought-provoking all right. There are concepts in here that will start audiences thinking in dozens of directions. Concepts about good and evil and what's important in one's life. This is the new mythology, really."

With two films down and seven more projected, producer Gary Kurtz must now

ponder the future of Luke Skywalker. "We plan to go into pre-production with the third film in January. After that... who knows?"

One area that Skywalker and cronies will definitely avoid is television. "We're still resisting TV," Kurtz grimaces. "I think it's difficult for any of the *Star Wars* films to have the right kind of impact on television. I didn't think that *2001* worked at all on TV. Eventually, we might wind up on television but not in the near future. Not as long as there is life in the *Star Wars* concept. I mean, our plots might play well on TV but you just can't give a TV audience that 'theater experience'; the group environment and the widescreen and soundtrack effects. That's one of the reasons that people went to see *Star Wars* so many times. They wanted that experience. One seven year old wrote me saying that he liked 'living with these people in the theater for two hours.' He wanted to do it over and over again. You can't do that on television.

"But the appeal of the *Star Wars* world goes beyond just that. One thing that George intended from the very beginning was to make these characters, this realm, something larger than life. He realized that today's kids seemed to have lost a sense of contemporary mythology. When I was a kid, westerns were big. A lot of those western plots were really patterned after the ancient Greek allegories. Then, the westerns disappeared. And the myths and the fables died with them; disappearing from the cinema during the past two decades. There just weren't any more heroes. Space fantasy stories are a great way for contemporary kids to get that essence of mythology, that sense of allegory.

"The *Star Wars* stories don't negate the old myths. They're still great. But most people today look to space as the last frontier, the last romantic outpost. It's the only place left to explore. You can't think in terms of exploring the Earth anymore because most of the areas have been done to death. Space is the only place left. In that sense, we're all very pleased with the success of both films. The characters, the concepts, have helped open up the idea of space exploration to kids who just weren't concerned with it. They had viewed space travel in terms of NASA and they said 'That's fine, but there's no way I can get involved with that lofty stuff. So what?'

"They really have to feel like Edgar Rice Burroughs did when he wrote *John Carter of Mars* to get interested in space. An adventurous attitude is what's needed to get today's kids to eventually go to Mars and beyond in real life. Hopefully, the *Star Wars* concept of science fiction will give them that."

Perhaps George Lucas, creator of the *Star Wars* realm, sums it up best. "Buck Rogers is just as valid as Arthur C. Clarke," he says. "They are both sides of the same idea. Stanley Kubrick made the strongest statement possible in terms of the rational side of the idea and I've tried to do the most in terms of the irrational, because I think we need that sense of romanticism. In real life, we are going to go into space in Stanley's ships but, hopefully, we are going to be carrying my laser sword and have a Wookiee at our side." □

Getting Into Politics

You say you want to make waves in the space migration movement? Ever considered becoming a Senator? President? Pope?

If we're going to build the future we dream about, thousands of us must get into politics in a big way. And politics is a game anyone can play.

If you haven't registered to vote yet, your first step is to get out your phone book and call the county recorder's office. They'll help you get registered.

How do you decide which party to sign up with? Thanks to the Federal Communications Commission's so-called "fairness doctrine" and government campaign subsidies (aka the incumbent protection laws) which work to favor the Democrats and Republicans, few people have heard about the third largest and, in spite of everything, rapidly growing Libertarian party. Their numbers include the "space cadets," an informal coalition of hardcore, pro-personal-freedom space enthusiasts. You can contact your nearest Libertarian group by writing them at 2300 Wisconsin Ave. NW #201, Washington, D.C. 20007. You can usually reach your local Republican or Democratic organization by looking them up in the phone book.

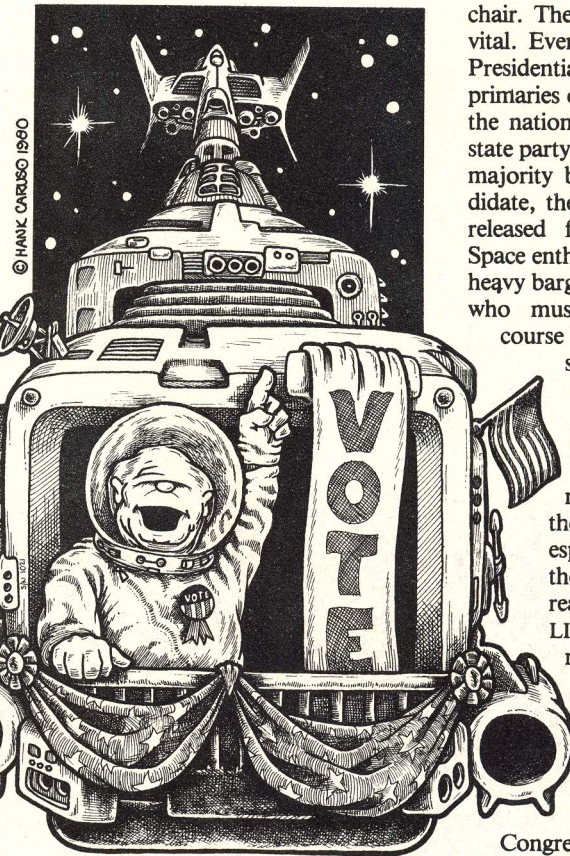
Don't register as an "independent." You must take a stand, even if it means tossing a three-sided penny, on which party you'll work for.

The next step is to become a volunteer.

First you can work on a politician's election campaign. Don't sneer at the "small-time" candidates, either. There are all sorts of minor elective offices: justice of the peace, water board, community college trustees, county supervisors, etc. True, these politicians can't do much to establish space colonies. However, you can probably work up to a position of real responsibility and learn a great deal in a fierce election battle for dog catcher, whereas in a campaign for the U.S. Senate an inexperienced person probably wouldn't get beyond licking stamps.

Second, you can donate money. A \$50 donation—that's less than a dollar per week per year—will get you invited to events where you can meet the candidate. You'll soon discover why our nation's political organizations are called "parties." Beer bashes, pot luck dinners, picnics, all sorts of whooping it up are the backbone of a successful political organization.

Before going to your first political "party," be sure you're up on the local etiquette. For example, if the sheriff hands you



a, uh, funny hand-rolled cigarette, do you sample it before you pass it on to the county attorney? And don't forget—if you turn it down, you could make the sheriff very paranoid (not necessarily a good idea in your smaller towns).

Third, you can get elected precinct committeeperson. These are the people who keep the machinery of the party running. You can get elected to this post in the primaries this summer. It's often easy to get elected because in many cases no one runs against you. Check with the headquarters of your party to find out how to get on the ballot.

As a precinct committeeperson you'll be expected to perform envelope stuffing, phone calling, door-to-door leafletting, and more. If you are a reliable hard worker at the small things you'll soon be given a chance to tackle more exciting tasks.

While sweltering in a storefront campaign headquarters folding brochures, be sure to hone your reconnaissance techniques—i.e., listen to the gossip. Unleashing your tongue in a roomful of politicians without knowing John just divorced Mary could be a real blunder.

Precinct committee people elect the county party chair and the state party delegates and

chair. The state level party organization is vital. Even in states where support of the Presidential candidates is determined by primaries or caucuses, the people who go to the national convention are chosen by the state party organization. When there is not a majority behind any one presidential candidate, the delegates to the convention are released from their prior commitments. Space enthusiast delegates could strike some heavy bargains with the would-be presidents who must woo them like crazy. (Of course politicians are known for their sterling word.)

By serving as a precinct committeeperson, by contributing money and doing campaign work, you'll soon get to know members of the U.S. Congress and their inner circle. That inner circle is especially important. They'll have the time to listen to your dreams, read your back issues of FUTURE LIFE and grow to trust your judgment. This trust, which you buy with hard work and personal commitment, will (usually) get you more clout than if you were a sheik toting a satchel of small unmarked bills. When the time comes that you need your

Congressperson's help, the inner circle will get you in to see him/her in person, and they'll back your requests.

You may wish to get a job on your Senator or Representative's Washington staff. This would make you almost as powerful as if you had been elected yourself.

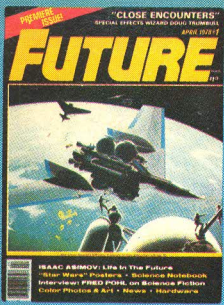
Enterprise, by Jerry Grey, gives an inside view of how Senate staffers have made history, pulling off crucial space funding authorization votes.

The big time, of course, is to get elected to Congress yourself. What does it take? I checked the biographies of 15 randomly selected Senators and Representatives. Fourteen had served in civic and church groups. Eleven had been state legislators. Ten went to law school. Three had been schoolteachers.

What doesn't show up in their biographies is the network of loyal, hard-working campaigners these politicians all developed. By starting at the bottom, nailing up campaign signs, carrying petitions, making deviled eggs for that Saturday afternoon meeting, you'll learn what makes volunteers tick and start building your own network.

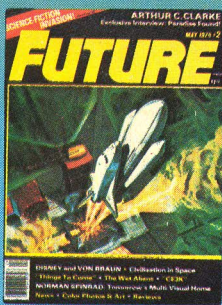
See you in the halls of Congress someday!

(Thanks to Arel Lucas, Conrad Schneider and Keith Henson, whose smart remarks enliven this column.—CH)



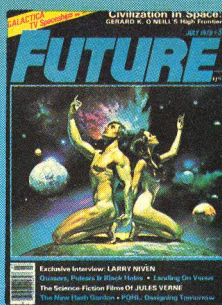
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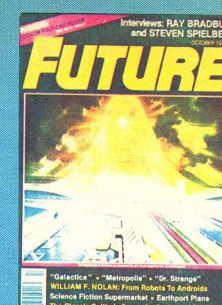
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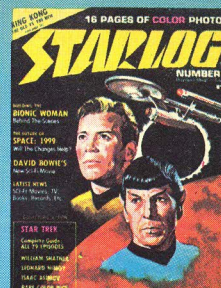
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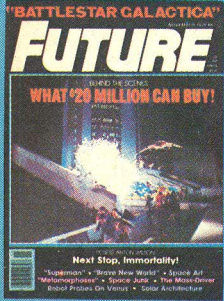
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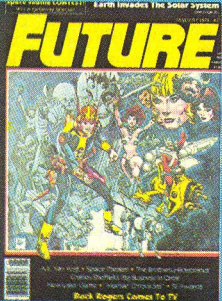
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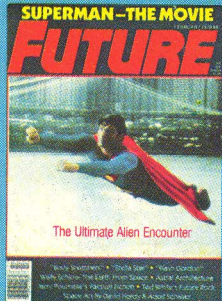
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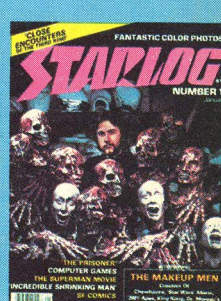
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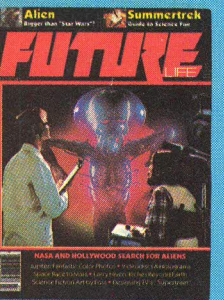
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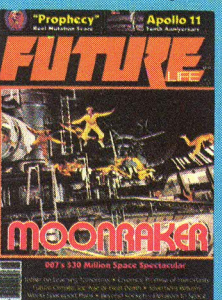
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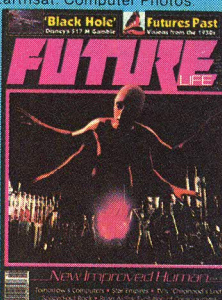
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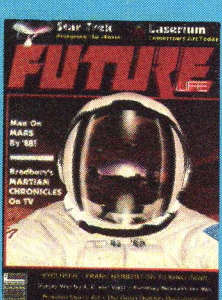
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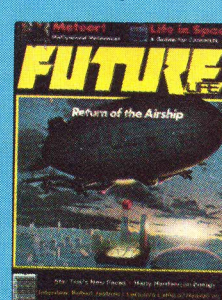
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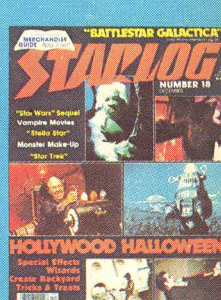
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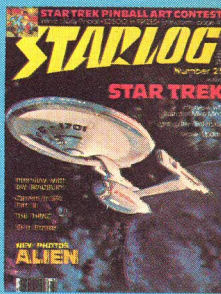
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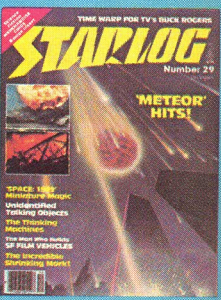
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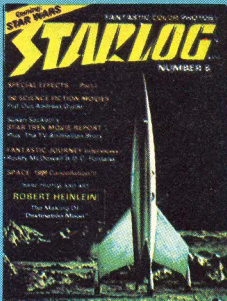
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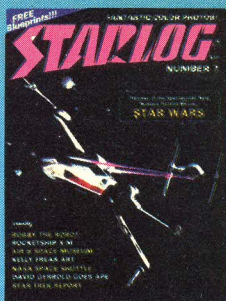
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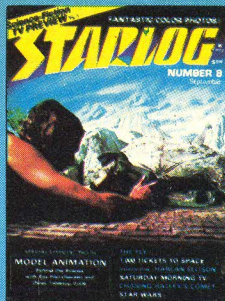
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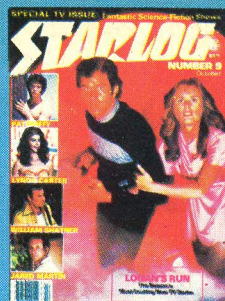
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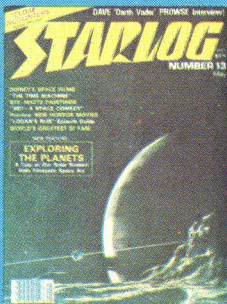
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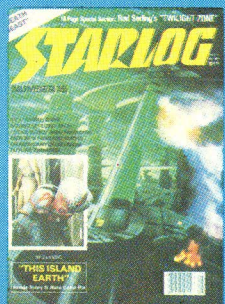
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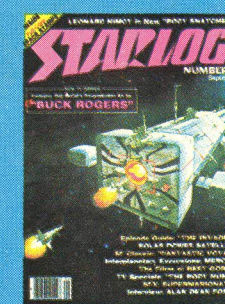
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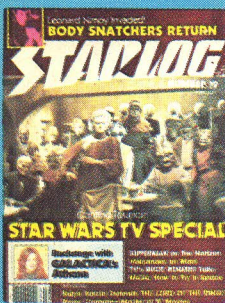
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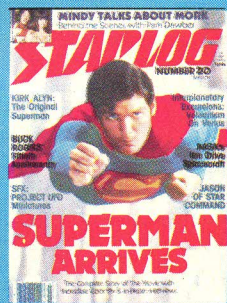
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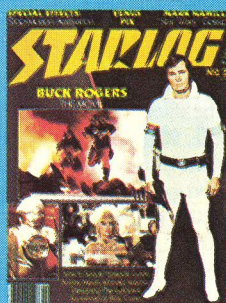
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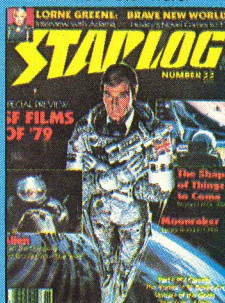
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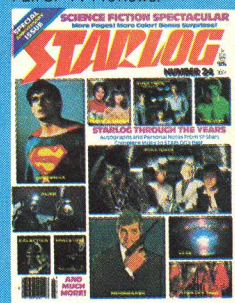
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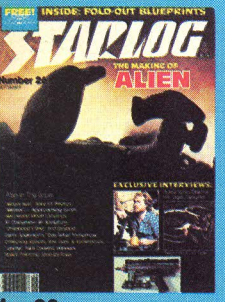
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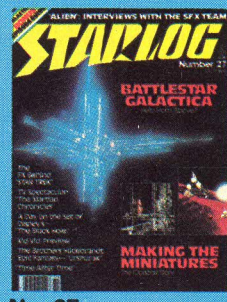
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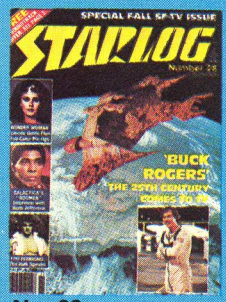
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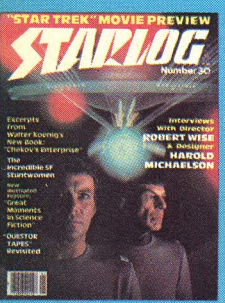
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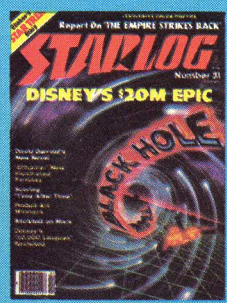
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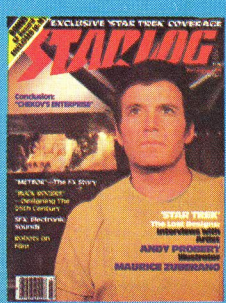
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probably do about anything. I'd probably give my right arm." He grins. "I think I should go up to check my drawings.

"But it's interesting," he continues. "I did a piece for Galactic Geographic called 'Life in the Void.' It's the most far out one, where we're outside of the Milky Way, and the Milky Way is in the background, you just see part of it. It's like an accidental photograph where an automatic camera recorded this thing, this organic starship that was outside the ship for just a brief moment.

"So I read this description of the Milky Way, and I had this idea and I painted it. Then later, I got a subscription to *Scientific American*, and with the subscription they always give this book called *Cosmology + 1*. On it they have a computer-generated photo of the Milky Way, and I checked it. And they were identical! It really was spooky.

"So that was the first time I really sat back and said, 'Where do I get these ideas?' Because once I had that image... it's like the image just comes. And then it's a matter of working it out; of polishing it until it looks right. It's not as arbitrary as you'd think."

Karl Kofoed's rich alien landscapes and the imaginative creatures that populate them may be "geared to entertainment," but the artist will readily admit that he also feels a responsibility toward the future that he tries to further through his art. "I really have a very deep reverence for life," he says. "I've just seen so many wondrous things right here on this planet that I really want to, in some way, open young people's eyes to the idea that we do have a tomorrow. We should live as though we have a tomorrow. If I'm ever able to get any political idea across, that's the one—if you can call it political.

"Think about the future. We are the crown of creation; we have to keep pushing no matter how bleak things look, whether we're on the precipice of war or not. We can't stop thinking about tomorrow.

"Being 37 years old, I come from a world where we weren't living constantly with the threat of nuclear holocaust, and I think that's one of the saddest aspects of our world today. It's one of the things that alienates the young from the old, too, because you have two drastically different points of view. I want to see that stopped. I want to see people thinking about the future again. And I think it's happening, and only in science fiction. It's probably one of the reasons I really want to stick with it, because I believe in it."

He leans forward, intent on the future. "I'm not into the 'me first' stuff, the 'hey, look what I can do!' I'm blessed that I can do this, I enjoy doing it, that's enough for me right there. If I can help contribute to some future thought..." Kofoed stops and smiles, embarrassed. "Well, I've already said that, I'm repeating myself."

Sentiments such as those could definitely bear repeating. □

next issue



PHOTO: © MGMTV

INTELLIGENCE INCREASE (I²)

Futurist/novelist Robert Anton Wilson considers the implications of geometric increase in human intelligence. His conclusion: We can expect more changes in the next 40 years than occurred in the last 4,000 years. We are continually transformed by the techno-social forces which have been mutating us since the dawn of humanity, and the pace is speeding up constantly. For a thought-provoking preview of the next quantum leaps in human intelligence, I² is mandatory reading.



PROSPECTING IN THE SOLAR SYSTEM

The Earth is running low on natural resources, many of them "nonrenewable." But the gold rush of outer space is on the horizon. Planetary scientist Stewart Nozette takes you on a guided tour of the solar system with a rundown of natural resources just waiting to be mined. How do we know they're out there? Is it possible to retrieve the riches of space for the benefit of Earthly appetites? Where will space miners look for valuable resources? Find out in the next issue.



PHOTO: © 1979 KENNER

ALIENS I HAVE KNOWN

Scientist and author Gregory Benford takes a look at the role of the alien in both science fiction and science fact. Are there scientific lessons to be found in the scenarios of *The Thing* and *Alien*? Can intergalactic behavioral patterns be culled from *Rendezvous With Rama* and *If The Stars Are Gods*? Now that NASA is listening for whispers of radio signals from distant, talkative life forms, the world just might learn something useful by seeing what freewheeling imagination has already envisioned.



PHOTO: © 1980 NEW WORLD PICTURES

BATTLE BEYOND THE STARS

Can the film industry's last major bastion of independence launch a large scale science fiction epic on a less than epic budget? Can a crew of young film novices successfully compete with the likes of *The Empire Strikes Back* and *Star Trek*? If anyone can pull such a miracle off, it's Roger Corman and his New World Pictures crew. And that's exactly what they're attempting with this summer's *Battle Beyond the Stars*. Next issue, join Corman, his cast and crew behind the scenes for the making of a major mini spectacle.

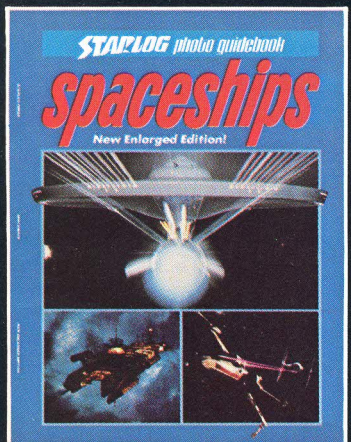
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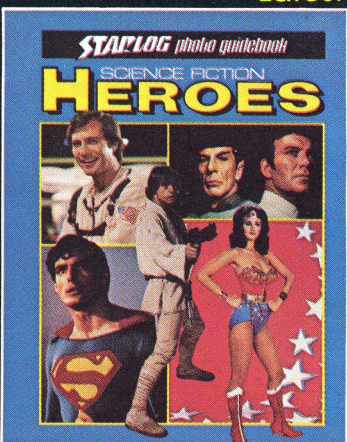
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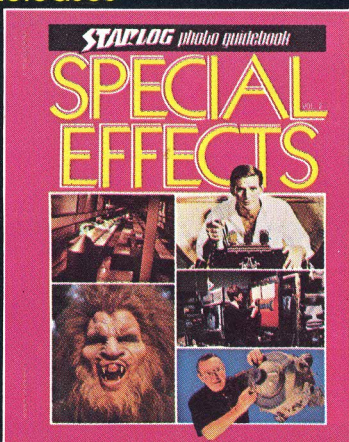
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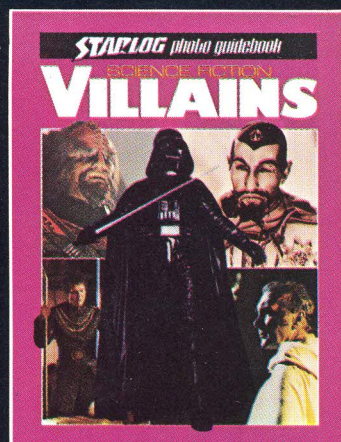
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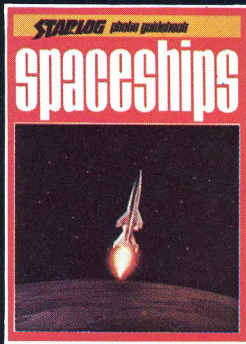


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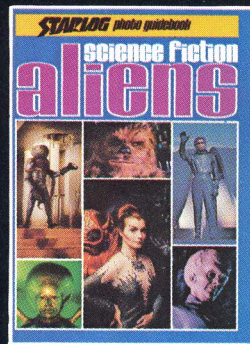
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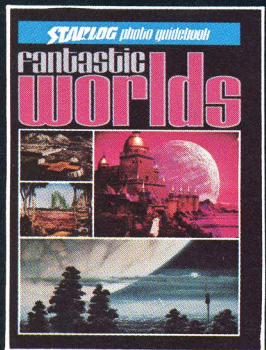
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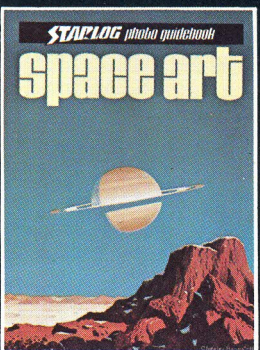
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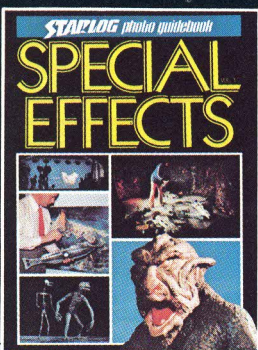
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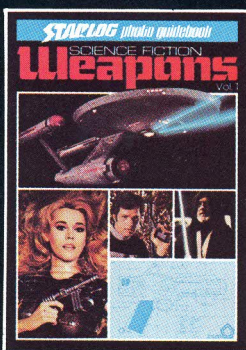
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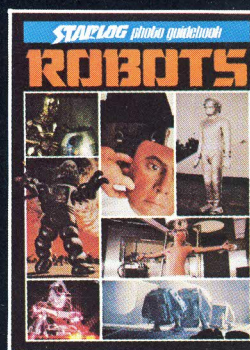
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